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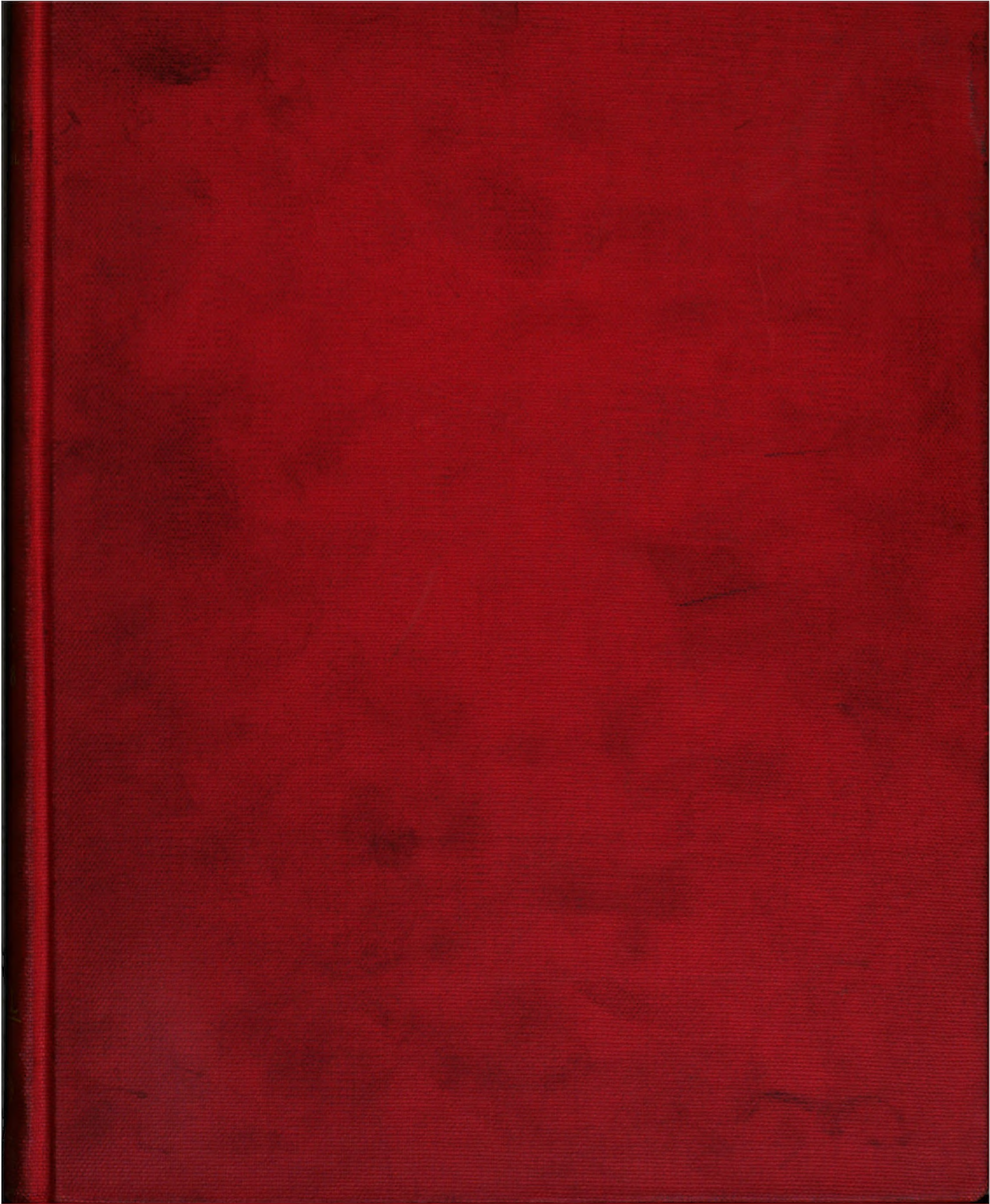
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AUTOMOBILE JOURNAL

DEVOTED TO

OWNERS OF NEW AND USED CARS DEALERS AND REPAIRERS

VOL. LXVI

PAWTUCKET, R. I., AUGUST, 1918.

NO. 1.



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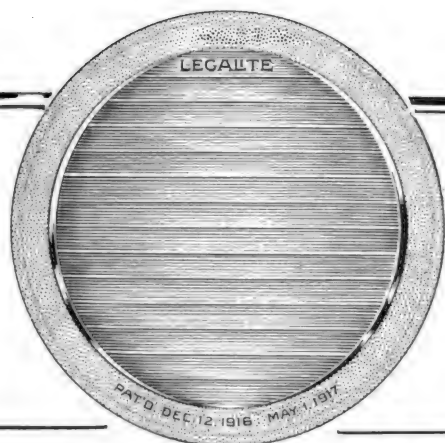
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AUTOMOBILE JOURNAL PUB. CO.
Times Building, Pawtucket, R. I.

The manufacturers of automobiles and tires have billions of dollars tied up in the industry and their future is at stake and dependent upon the prosperity of their distributing organizations. It is only fair to assume then that any reports vital to their welfare would be carefully watched for by them and carefully examined and analyzed so that they could make an accurate and authoritative statement to the public and trade. Until such information comes direct from these sources it behooves the trade, as well as the public, to cease conjecturing and guessing unless they can render their dreaming harmless by keeping the results to themselves.

At present the best way to serve the country and ones self is by keeping on the job or by shouldering a gun and fighting.

ENGLAND has never been a large producer of motor cars, comparing her output with the American production, and the industry there practically suspended so far as the manufacture of passenger cars is concerned, shortly after the war, but it is understood that through the development of her factories for engine production on a large scale and in other machinery lines the business of making automobiles will take on a decided boom shortly after the war. In fact England is now equipped with plants, machinery, skilled workmen and women, which combined with necessary factory organizations and adequately capitalized companies, will enable her to meet the world's competition in motor cars on a formidable basis. As a result of these conditions it is also expected that her manufacturers will enter the low priced field on a greater scale than prior to the war, as they will be in a position to undertake quantity production on a profitable basis.

THE period of "watchful waiting" has passed so far as assuming a stand on the war is concerned, but this attitude is the most appropriate one to adopt at present toward the automobile situation and should be the slogan of every motorist, automobile distributor and accessory dealer. There are all kinds of rumors afloat regarding the outlook for the passenger car, tire and accessory supplies, and these all emanate from thoughtless people discussing things of which they have no knowledge and for which there is no foundation in fact.

"There is nothing definite in the situation at present and no decisive action has been taken that means the cessation of passenger car production or which threatens the supply of either tires or supplies as yet, and no man actually knows that any such drastic steps are contemplated even. I doubt if such a situation will ever be witnessed in this country, as the industry in the trade is too enormous an economic factor in the general welfare and prosperity of the nation to be smothered without long and careful deliberation of the consequences," said the sales manager of one of the largest car distributing agencies in New England.

In view of these facts it is far better for everyone to assume the attitude of "watchful waiting" than to go about disseminating reports and opinions based solely on ideas gained from patching and piecing together a lot of rumors collected at random. Much harm has already been done by the indiscriminate circulation of stories that passenger car production would be stopped and that there would soon be a shortage in the supply of tires, as the effect of such reports has had the result of raising the prices on these products and disturbing conditions in the trade.

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Automobile Journal Publishing Company

TIMES BUILDING

PAWTUCKET, R. I.

ANNOUNCEMENT TO SUBSCRIBERS

Beginning with this issue the Automobile Journal will issue monthly instead of semi-monthly. The change is necessary to comply with the conservation policy of the government as applied to both materials and labor, there being constantly increasing shortages of both, with no lessening of demand unless instituted by the publisher.

The purpose of the Automobile Journal Publishing Co. is to co-operate with the government to the fullest extent. Patriotism is first in business as well as in public, private or civic life.

In making the change from semi-monthly to monthly the Automobile Journal is also conforming with the tendency of the times, on which publishers are generally agreed,—that practically and ideally the best interests of publisher and subscribers are served.

The readers of the Automobile Journal will benefit in that they will have in each issue a greater number of pages, the character of the contents will be strengthened and improved, and both in editorial quality and volume the value of the publication will be decidedly enhanced. The main object of the publisher has been to afford subscribers the largest measure of satisfaction, and the announced decision was reached only after their interests had been given full consideration, and provision made to give them a better magazine than had ever before been produced.

Automobile Journal Publishing Company

THE AUTOMOBILE JOURNAL

VOL. LXVI.

PAWTUCKET, R. I., AUGUST, 1918.

NO. 1.

States Take Action To Suppress The Glaring Headlight Nuisance

Drivers Operating with Plain Lenses Will Soon Find Their Road
Strewn with Difficulties—New York, Massachusetts and
Connecticut Start Campaign of Prosecutions

THE owner of an automobile with plain head lamps and lenses will soon find his scope of operations very limited and his trips quite expensive, as when driving after dark he will be a violator of the law in most every eastern state.

It is becoming apparent to the highway officials and heads of motor car departments of the various states that in

tors have instigated the present widespread campaign for head lamp regulation, which has met such popular approval that it will soon bear fruit to an extent that the unregulated headlight will not be tolerated in any state.

Laws to Compel Reform.

Like many situations calling for a public reform conditions bearing upon it have completely reversed themselves, as

ated in their automobile law any regulatory measures relative to headlights, and the question of whether or not a motorist is to be a dangerous factor on the road is left to his own discretion. He is supposed to exercise the courtesy of not offending other motorists or endangering their lives, but just how he can do this without the proper lighting equipment is not made plain.



Photographic Evidence of the Danger of Glaring Headlights, Driver in Background Is Blinded to View of Railroad Crossing and Gates.

the headlight problem lies one of the principal causes of the increasing number of motor car accidents on the highways and they are taking action to eliminate this source of accident by having laws enacted to regulate headlights and are enforcing them.

Every driver of a car must admit of the great danger attending the use of the plain lens in head lamps, for in fact the very complaints of such car opera-

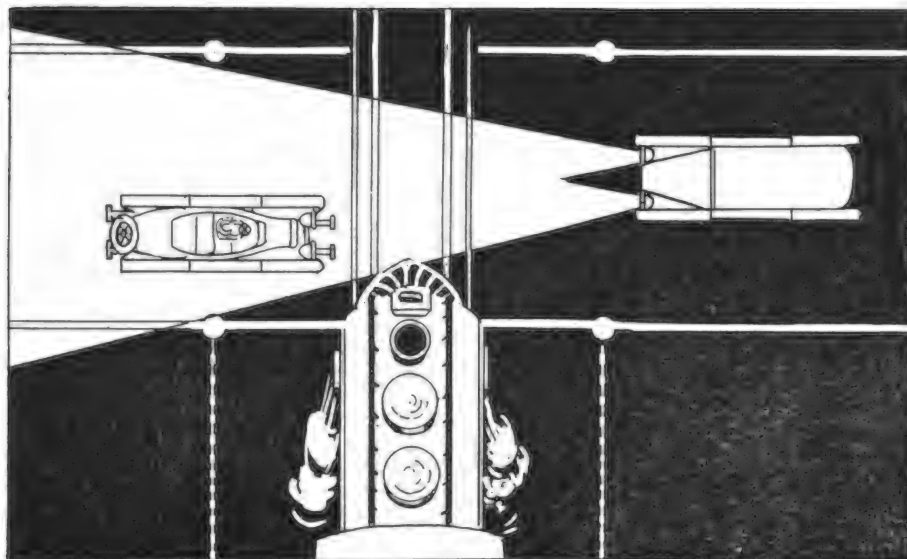
where formerly there was only a half-hearted demand that the glaring headlight be done away with, there now seems to be a general demand representing the consensus of opinion that no cars be allowed on the road with lights that can blind another driver or pedestrian and it is now taking form in laws that will compel the proper lighting equipment for every car.

Some states have not as yet incorpor-

However, motorists of other states are taking the precaution of not letting these motorists become a nuisance on their highways and unless they comply with the laws of the more progressive states they will be obliged to restrict their trips within the confines of their own state boundaries.

Responsibility of Officials.

Practically every state has waived its rights of taxing motorists from other



At an Ungated Railway Crossing the Blinded Driver Is Unable to See the Dim Lights of the Approaching Locomotive.

states for periods of two weeks to a month and have also shown visiting parties great leniency in the matter of observing the other automobile laws, but it has lately become apparent to those in charge of enforcing the laws that they have no right to permit motorists with dangerous headlights to use their highways to the detriment and danger of motorists who have sought protection against accident in securing the passage of laws to compel the use of head lamps with proper lighting capacity and means of directing the rays in their proper sphere.

Investigation of the matter which has only lately begun on an extensive and thorough scale will probably be productive of many beneficial developments affecting motoring and car owners. In states where owners are compelled to have properly regulated headlights they will certainly be entitled to a lower rate for collision and accident insurance and the careful study of this lighting problem will probably result in the development of a more perfect type of lense or lighting equipment if such a thing is possible, many lenses at present on the market meeting all the requirements of the laws regulating lights while retaining their maximum efficiency for driving purposes.

Massachusetts Takes Action.

In Massachusetts the authorities have again taken cognizance of the lighting problem to the alarming increase in the number of highway accidents, many of which have been directly attributable to improperly regulated automobile head lamps.

For this reason the Massachusetts State Highway Commission has adopted a new rule owing to the numerous accidents and narrow escapes reported from collisions by machines traveling in different directions at night in the suburban and rural sections. This rule is as follows:

"Whenever there is not sufficient light within the limits of the highway location to make all persons, vehicles or substantial objects clearly visible within

said limits for a distance of at least 150 feet, the white lights or lights of yellow or amber tint, which a motor vehicle is required to display by section 7, chapter 534, acts of 1909, as amended shall, when said vehicle is in motion throw sufficient light ahead to show any person, vehicle or substantial object upon the roadway straight ahead of the motor vehicle for a distance of at least 150 feet.

"Any light thrown directly ahead or sidewise shall be so arranged that no dazzling rays from it or from any reflector shall be at any time more than $3\frac{1}{2}$ feet above the ground on a level road at a distance of 50 feet or more ahead of such vehicle, and said light shall be sufficient to enable the operator of the motor vehicle to see any person, vehicle or substantial object upon the roadway or side thereof for 10 feet on each side of the motor vehicle 10 feet ahead of such vehicle.

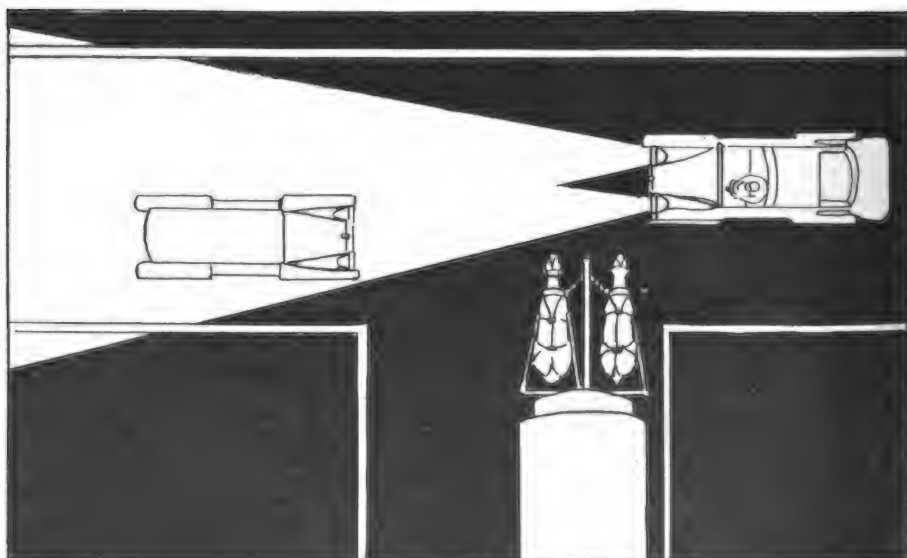
Col. Sohler of the Massachusetts State Highway Commission recently stated that the police of the various towns and

cities were now actively cooperating with the commission in suppressing the illegal use of headlights and that over 80 prosecutions had already been made in the vicinity of Springfield, Mass., alone. With over 175,000 cars registered in that state it is naturally a difficult task to impress upon every operator the necessity of observing this law, and particularly so as in the past the lax attitude on the part of the police toward this regulation has conveyed the impression generally that the headlight regulations were not looked upon as requiring strict observance. To overcome this belief on the part of motorists and to quickly bring them to a realization of the dangerous practise of driving about the country with glaring lamps, Col. Sohler has suggested that people make complaints to the commission, give the number of the cars of offending operators and they will be summonsed.

Rhode Island in Line.

The State Board of Public Roads in Rhode Island, which has the power to make such regulations governing motor car headlights as is deemed necessary without legislative action, is now considering the adoption of some rule regarding the use of head lamps with the object of eliminating the nuisance of glaring headlights. Nothing definite has been decided by the board as yet, but it is understood that any action taken will conform closely to that already in force in Connecticut and Massachusetts, as Rhode Island is hemmed in on both sides by those states and its motorists use their roads extensively, which fact will make it necessary to meet the conditions imposed by the bordering states.

In view of the improved driving conditions that will obtain when the regulated headlight is in use, the trouble or expense incurred by the motorist in effecting it is negligible, as there are many devices already on the market which meet with the provisions of the law and which do not call for a great outlay of money or time or expense for installation.



The Driver, Blinded by the Approaching Lights, Cannot See the Team of Horses Crossing His Path.

Action in Pennsylvania.

A similar situation has existed in Pennsylvania. The authorities have been empowered with a law to suppress the glaring headlight nuisance, but have been rather lax in making prosecutions until recently, when the superintendent of police of Pittsburgh started a crusade against automobilists with improper headlight equipment and the campaign will be continued, it is understood, until motorists thoroughly understand that the law regulating the limitations of their lights must be observed.

New York Makes Rigid Test.

In New York state the authorities have made extensive tests of head lamps and devices and will soon issue a list of the types approved. The tests under which lights are to be approved in that state are very exhaustive and exact, the conditions to be fulfilled to comply with the intent of the new law being specified for the purposes of testing as follows:

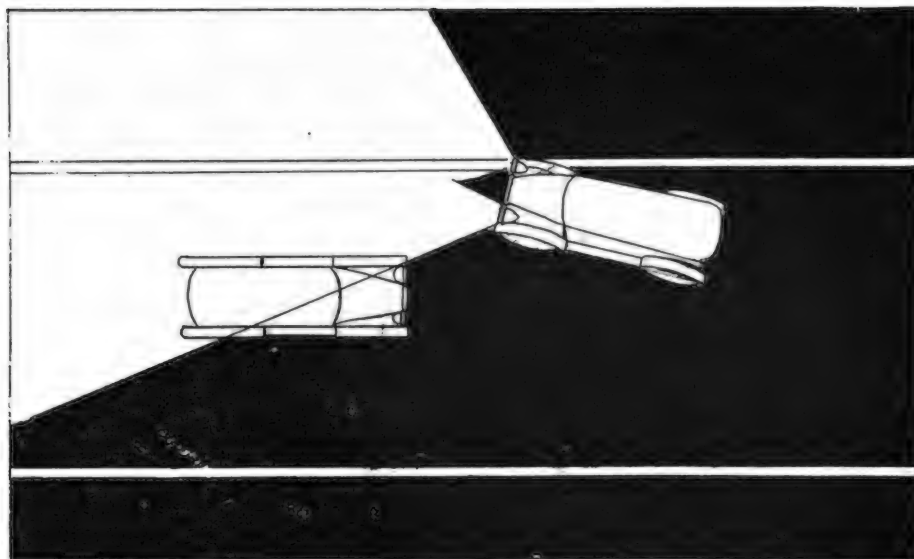
1. Any pair of head lamps under the conditions of use must cast a beam which when measured on a level surface at a distance of 200 feet directly in front of the car and at some point between the level surface and a point 42 inches above this surface, is not less than 1200 apparent candlepower.

2. Any pair of head lamps under the conditions of use shall cast a beam which, when measured at a distance of 100 feet directly in front of the car, and at a height of 60 inches above the level surface, does not exceed 2400 apparent candlepower, nor shall this value be exceeded at a greater height than 60 inches.

3. Any pair of head lamps under the conditions of use shall cast a beam which, when measured at a distance of 100 feet ahead of the car, and seven feet or more to the left of the axis of the same, and at a height 60 inches or more above the level surface, does not exceed 800 apparent candlepower.

Laboratory Test Required.

In order to determine whether any



A Driver Blinded by Glaring Lights Instinctively Crowds Toward the Light, Forcing the Oncoming Machine into the Ditch.

particular device conforms to these requirements, it shall be subjected to laboratory tests according to the following specifications:

Two pairs of samples of the device submitted shall be subjected to test. In the case of front glasses the samples shall be of 9¼-inch diameter.

Reflector Requirements.

The reflectors used in connection with the laboratory tests shall be of standard high grade manufacture of 1.25-inch focal length, with clean and highly polished surfaces, and as nearly truly paraboloidal in form as practicable, and as approved for this purpose by the national bureau of standards.

The manufacturer of the device shall be given due notice of the date and place of test. Manufacturers' representatives present at the test shall be privileged to adjust their devices in any way which represents an ordinary and legitimate adjustment, including tilting the lamps or reflectors, which can be carried out by purchasers of the device, or such adjust-

ment may be made by the laboratory expert acting on the instructions of the manufacturer. The character of the adjustment so made shall be carefully noted and stated in the report as manufacturer's adjustment.

How Tests Are Made.

The tests shall be as follows:

Test 1. Four-point test of pairs of samples.

A pair of testing reflectors, mounted similarly to the head lamps on a car, shall be set up in a dark room at a distance of not less than 60 feet nor more than 100 feet from a vertical white screen. If a testing distance of 100 feet is taken the reflectors shall be set 28 inches apart from center to center and if a shorter testing distance is taken the distance between reflectors shall be proportionately reduced. The axes of the lamps shall be parallel and horizontal, or as tilted in accordance with manufacturer's adjustment. The intensity of the combined beams shall then be measured with each pair of samples in turn, with the reflectors fitted with a pair of each of the following types of incandescent lamps, in turn:

- (1) Vacuum type, 6-8 volts, 17 mscp., G-12 bulb.

- (2) Gas filled type, 6-8 volts, 20 mscp., G-12 bulb.

The lamps shall be adjusted to give their rated candlepower. Measurements shall be made at the following points at the surface of the screen:

A. In the median vertical plane parallel to the lamp axes, on a level with the lamps.

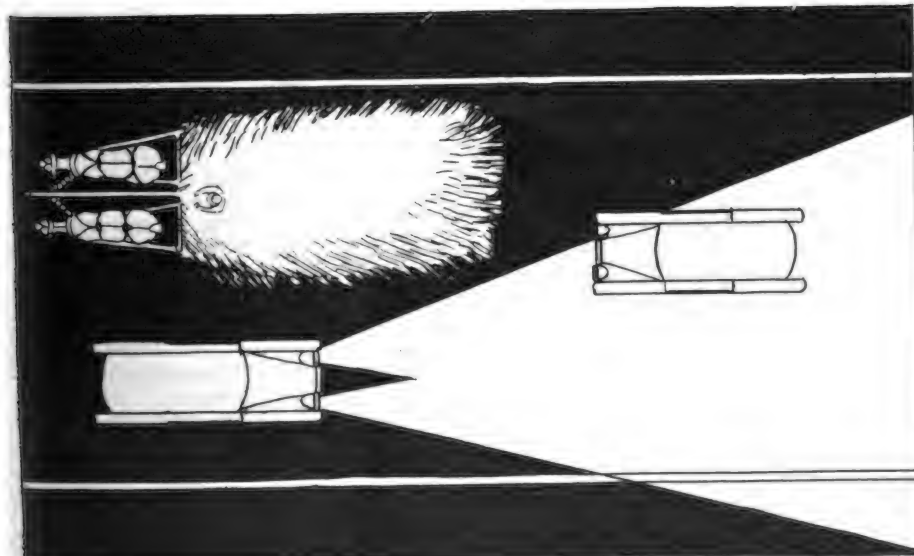
B. In the same plane one degree of arc below the level of the lamps.

C. In the same plane one degree of arc above the level of the lamps.

D. Four degrees of arc to the left of this plane and one degree of arc above the level.

Specifications of Samples.

In an acceptable device both pairs of samples shall conform to the following specifications for observed apparent candlepower:



One of the Greatest Dangers from Headlight Glare Is of Collision with Slow Moving Vehicles Ahead.

Points A and B. At at least one of these points the apparent candlepower shall not be less than 1200.

Point C. The apparent candlepower shall not exceed 2400.

Point D. The apparent candlepower shall not exceed 800.

Provided, however, that if the test indicates that a device which is unacceptable with either of the test lamps will come within the specifications with lamps of another candlepower or of the other type, the device may be passed with corresponding limitations as to the incandescent lamps to be used in connection with it.

Test 2. Complete test of single sample.

A single sample taken as an average representative of the device as manufactured, shall be submitted to a complete test with a vacuum incandescent lamp of 17 candlepower 6-8 volt rating in a G-12 bulb. This test shall show its beam characteristics by actual measurements made according to recognized and exact methods.

One pair of the samples submitted shall be retained by the testing laboratory for purpose of future reference and as samples of construction, and the other pair shall be returned to the office of the secretary of state.

Report on Result of Test.

The report of the tests shall be rendered in duplicate to the secretary of state, and shall be signed or initialed not only by the expert making the test, but also by a person representing the more general responsibility of the institution making the test. It shall include a statement by the testing laboratory as to whether the device has passed or has not passed the specifications as herein given; also, a statement as to the maximum or minimum candlepower to be used with the same and as to the other conditions necessary in the operation of the device in such a way that it will comply with the requirements of this specification.

Connecticut's New Law.

Connecticut has had a new headlight law for some time, but did not strictly enforce its provision on visiting motorists until recently, when notices were sent to the motor car or highway department heads of the various surrounding states of the intention of the state commissioner to enforce the law on all motorists using the highways of Connecticut.

The motorist to escape prosecution in Connecticut must see that the headlights of his car meet the following provisions:

"Give 150 feet of driving light. Throw no dazzling rays or beams of reflected light ahead of the car higher than 42 inches at a point 75 feet ahead of the vehicle. Give light 10 feet to each side at a point 10 feet ahead of the car."

The pamphlet which was sent out by the Connecticut Commissioner of Motor Vehicles contained the name of about 25 kinds of head lamp reflectors, lenses and devices which are approved by the authorities of that state.

Following is a list of approved devices issued by the department of motor vehicles of Connecticut:

BARTELSTONE LENSES—Made by Bartelstone Co., Inc., 1170 Broadway, New York, when used with 21-24-30-36-40 candle power bulb at its indicated voltage.

BERMAC REFLECTOR—Made by W. H. Berry, 31 State street, Boston, Mass., when used with a 24 candle power bulb at its indicated voltage.

CORNING CLEAR LENS—Made by Corning Glass Works, Corning, N. Y.,

used with 40 candle power bulb at its indicated voltage.

MASK AND LIGHT CONCENTRATION—Made by Hamilton & De Loss, 745 Main street, Bridgeport, when used with 18 candle power bulb at its indicated voltage.

LEGALITE LENS—Made by the Legalite Corporation, Boston, Mass., when used with 15-18-24-36 candle power bulb at its indicated voltage.

MORE-LIGHT LENS (Amber)—Made by L. E. Smith Glass Co., Mt. Pleasant, Pa., when used with 21 candle power bulb at its indicated voltage.

MORE-LIGHT LENS (Clear)—Made by L. E. Smith Glass Co., Mt. Pleasant, Pa., when used with a 21 candle power bulb at its indicated voltage.

OFFSET REFLECTOR—Made by C. T. Sutterley & Co., 237 Hamilton street, Philadelphia, when used with a 21 candle power bulb at its indicated voltage.

OSGOOD LENS—Made by Osgood Lens and Supply Co., 1241 S. Michigan avenue, Chicago, when used with a 24 candle power bulb at its indicated voltage.

QUEEN CUT GLASS—Made by Flemington Cut Glass Co., Flemington, N. J., when used with a 15 candle power bulb at its indicated voltage.

REFLECTOR—Made by the Rand Reflector Co., Haverhill, Mass., when used with a 21 candle power bulb at its indicated voltage.

SAFERLITE LENS—Made by the Saferlite Co., 220 Fifth avenue, New York, when used with a 24 candle power bulb at its indicated voltage.

VICTORIA SIMPLEX—Made by the Victoria Manufacturing Co., 12-16 John street, New York, when used with 15-18-21-24 candle power bulb at its indicated voltage.

WARNER LENS—Made by the Warner Lens Co., 914 S. Michigan avenue, Chicago, when used with 15-21 candle power bulb at its indicated voltage.

MACBETH LENS—Made by the MacBeth-Evans Glass Co., Boston, Mass., when used with 15-18-21-24 candle power bulb at its indicated voltage.

McKEE LENS—Made by the McKee Glass Co., Jeanette, Pa., when used with 15-18-21-24 candle power bulb at its indicated voltage.

JEFFERSON LENS—Made by the Jefferson Glass Co., Fallonsbee, W. Va., when used with 15-18-21-24 candle power bulb at its indicated voltage.

PRIMOLITE LENS—Made by Barry Co., Ltd., 122 S. Michigan avenue, Chicago, when used with 15-18-21-24 candle power bulb at its indicated voltage.

NOGLARE AUTO LENS—Made by Noglare Auto Lens Co., Pittsburgh, Pa., when used with 21-24 candle power bulb at its indicated voltage.

STEWART LENS—Made by the Stewart-Warner Speedometer Corporation, Chicago, when used with 15-18-21-24 candle power bulb at its indicated voltage.

SHALER LENS—Made by the Shaler Lens Co., when used with 15-18-21-24 candle power bulb at its indicated voltage.

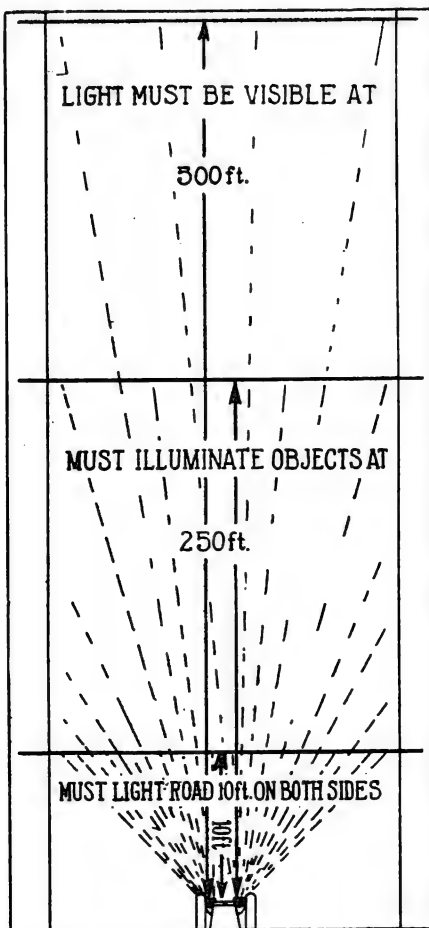


Diagram of Light Projections. Meeting Maximum Limitations of Every State.

when used with a 21 candle power bulb at its indicated voltage.

CORNING NOVIOL LENS—Made by Corning Glass Works, Corning, N. Y., when used with a 21 candle power bulb at its indicated voltage.

CONTROLITE LENS—Made by Super-Lighting Co., 1834 Broadway, New York, when used with a 21 candle power bulb at its indicated voltage.

FRACTOR LENS—Made by Crew Levick Co., Land Title Building, Philadelphia, when used with 15-18-24-36 candle power bulb at its indicated voltage.

HOLOPHANE LENS—Made by Holophane Glass Co., 340 Madison avenue, New York, when used with 12-15-18-21 candle power bulb at its indicated voltage.

HOTCHKISS LENS—Made by Hotchkiss Co., Torrington, Conn., when

Handling Used Cars By Systematic Methods

Carefully Worked Out Plan of Inspection and Appraisal Enables Bishop, McCormick & Bishop, Inc., To Place Arbitrary Price On Cars Offered In Trade That Is In Keeping With Sound Business Policy

BISHOP, McCORMICK & BISHOP, INC., Brooklyn, N. Y., distributors of Dodge Brothers cars on Long Island, have worked out methods of handling used cars which seem to incorporate the essentials that are necessary to place this end of the automobile dealers' business on a sound basis. The whole secret of this plan is practically contained in the appraisal, the details of which is shown in the accompanying form (Fig. 1), and which includes all the necessary items to be checked in arriving at a fair value for a used car.

Their method of appraising the value of a used Dodge car is to establish, first of all, the resale value of used Dodge cars of different serial numbers. These serial numbers usually follow very closely any radical changes or improvements that have been made to the car since it was first offered to the public. They have found, from experience, that a system of this kind is necessary in view of the fact that Dodge Brothers do not manufacture a yearly model of series; and while they set the general principle that any used Dodge car, in good condition, is worth as much as any other used Dodge car in the same condition, nevertheless, they recognize the fact that the general trade is influenced to a degree by changes in style and construction, and that is their only reason for the adoption of these serial number divisions.

Having established the price at which the car shall be sold, and having established, through their records of past years, the average selling cost, the average advertising cost, the average selling expense (based on salaries or commissions paid) and the average storage expense per car, they are then in a position to tell very closely what their total sales cost will be on the car. Then they have the used car tested by their service department, to find out what their standard charge will be for putting the car in good running condition. Having found out what this charge will be they deduct from the sales price what they know they can get for the car, the sales cost, repair cost and the margin of at least \$25 for contingencies. The amount left after these deductions have been made is the allowance given to the customer. It is quite apparent how valuable their standard practise repair system is in handling used cars. If their repair department sets the cost of \$50 to put the car in condition, they know that the charge will not exceed \$50, and there is no element of uncertainty in this charge, as there likely would be if only an estimate of the cost of overhaul were given. Since they have made it a practise for the service department to charge every

other department the same rates for work, which are charged to the retail customers, there is no likelihood of this work being slighted in any respect by the service department, and the used car department has the same "come-back" on the service department if the work is not properly done, which a retail customer would have. The form shown in Fig. 2 shows the general condition of the car in detail when its value was appraised. This form is printed on a card and is used where a customer receives an appraisal on his

car, but wishes to continue to use it until his new car is delivered to him. The careful checking over of all the items on this card makes it absolutely certain that the car will be turned in in the same condition as when appraisal was made. The used car record sheet (Fig. 3) permits of a complete and definite record being kept of all the expense items that entered into the sale of any particular used car, so that it is absolutely certain at the start that a car will not be sold except at a price that will cover all the items of expense plus a small margin of

A COPY OF THIS FORM TO BE
USED FOR EVERY CAR
TAKEN IN TRADE

BISHOP, McCORMICK & BISHOP, INC. No. _____

USED CAR COST TALLY

Car Received _____ 191__

BOUGHT FROM

ADDRESS

MAKE

STYLE

SALESMAN

MOTOR No.

CAR No.

LICENSE No.

In exchange for _____ car at \$ _____

Appraised by _____ at \$ _____

CHARGES

1. Trade allowance

2. Painting

3. Tools to make up equipment

4. Tires and Tubes. (New, repaired or second-hand)

5. Supplies

6. Battery Repairs

7. Upholsterer Repairs

8. Repair Job No. _____ Nature _____

9. Repair Job No. _____ Nature _____

10. Repair Job No. _____ Nature _____

OVERHEAD OR INDIRECT COSTS

1. Insurance

2. Labor—Department Repair Men (includes general repair, demonstrations and lessons)

3. Department Salaries

4. Advertising

5. Rent, Light, Heat

Total Charges _____ \$ _____

CREDITS

Agreed difference, if any, between allowance and appraisal made by _____ \$ _____

Extra Equipment { Sold
In Stock

Rental _____

Sold to _____

Total Credits _____ \$ _____

Loss or Gain _____ \$ _____

Paid by Cash _____ Trade _____ Notes _____

Inventoryed _____ 1st at _____

Inventoryed _____ 1st at _____

Inventoryed _____ 1st at _____

Fig. 1—Used Car Appraisal Form.

Know The Facts And The Truth

The Golden Rule of
CLIFFORD M. BISHOP,
General Manager
Bishop, McCormick & Bishop, Inc.

If the desire is to build up a business, not a "game," it is essential that a dealer should establish certain principles and practices for his business, and that he should gather about him men of honesty and character, who will carry out these principles and practices.

Not very long ago it was generally thought necessary to have a service manager who was slippery and had the ability to "jolly" and "get by" with the customers. Most of us have now found that anyone who can "get by" with the customers can quite likely "get by" with the boss, and, therefore, the introduction of men of this type into a business is quite certain to ruin its business character.

We have found that it is essential to know the truth and to face it; so we have never made it a practice to severely criticize anyone who has made a mistake, provided he tells the truth about it. Knowing the real facts is half the battle in being fair to yourself and your customers. Therefore, there should be no place in any organization for a liar.

I think the average dealer is likely to make the mistake of treating his business as a cheap business, in the sense that it is not able to support sufficient men of good character and ability at satisfactory salaries. If a dealer believes he is engaged in a restricted business, then his case is truly hopeless, for I sincerely believe that there is no piece of territory of any size that has a definite and fixed limit of sales for any particular make of standard automobile, especially in the low and medium priced classes. Therefore, it is ridiculous for any sales agency to figure that its sales possibility will not permit of its employing men big enough and broad enough to get the biggest possible returns in the right way from the territory covered. There is always a definite, proper and certain profit from the intelligent use of the right kind of man power.

It is also the firm conviction of our organization that every major department of a business should be a paying department. Sales can unquestionably pay, service can be made to pay well and will pay increasing returns as time goes on; the parts department cannot help but be profitable, and even the used car department can at least pay its way. This is all, of course, predicated on the fact that there must be a man at head of each department capable of handling it.

A business based on character is surprisingly easy to systematize. The practice in each department can be standardized and sufficient leeway can be given to each executive to insure that the man responsible for the direction of the entire business is not spending nine-tenths of his time on the petty details of the business. In other words, the clear establishment of authority and responsibility should leave some one in the business free of petty worries to think about it as a whole and to prepare for any future conditions that the business is likely to meet. This man will give very little thought to the present; his thinking will be aimed a month, two months, or even three months ahead, and, in this way, he will guide the business so as to avoid the shoals and reefs.



CLIFFORD M. BISHOP.

Clifford M. Bishop

profit. Consequently, if each transaction is a profit, it is reasonable to assume that the total results of the department will net a profit.

Another form of their system illustrated (Fig. 4) is a card index that enables them to keep a record of their used car stock. It contains a recapitulation of all the essential details and is the final analysis of the used car stock taken from the other records.

Used Car Customer Receives Same Treatment.

Bishop, McCormick & Bishop, Inc., admit that their used car system would not work quite so well with used cars of other makes that they have to take in on the trading basis, but they also contend that these cars cannot be sold on the same basis that they sell used Dodge cars; therefore, the same principles will not apply to used cars of other makes.

In handling of used cars of other makes they do not undertake to repair them. They will make minor adjust-

ments and these are generally made by two or three mechanics who are permanently attached to the used car department. They will clean the cars and even paint them, but they are invariably sold "as is." Their allowances on used

cars of other makes are much lower than the owners could receive by taking them back to the agency from whom they purchased them. They have found that the quality of the Dodge car as maintained by the efficiency of their service department, has placed them in a position to secure used car business on a basis that makes each transaction profitable, although their allowance figures are invariably lower than those of their competitors.

They never sell a used Dodge car until it has been placed in excellent mechanical condition, and they never sell except at a price that bears exceedingly close relation to their new car price. Through the purchase of a used car from them the customer receives exactly the same treatment and the same facilities from their organization and plant as he would if he purchased a new car. He receives the complete driving course, has the privilege of taking the course on care and maintenance in the school, and he receives the same attention from the service department.

Their guarantee on used cars is liberal and includes the following points: 1—We guarantee that the value of each car is accurately represented by the price quoted. 2—That the condition of each car is exactly as represented. 3—That we will make minor adjustments which may be necessary, without charge, for a period of 30 days after delivery. 4—That we will take back any car within 30 days from date of delivery, at its sale price, minus a reasonable charge for use, in exchange for another used car or in part payment of a new car. Aside from the advantages of their educational department, they offer to purchasers of used cars free inspections, free advice and their flat rate charges for work. They also sell used cars on the easy deferred payment plan if desired.

A Side Street Advertised Into Prominence.

Their used car sales room is entirely separate from their new car sales room, being located at 1243 Fulton street. Although this is one of the most prominent business streets in Brooklyn, unavoidable circumstances compelled them to locate their main offices and new car sales room at 20 Halsey street. Here is a contrast of a less prominent location

SALEMAN	DATE	191
BISHOP, MCCORMICK & BISHOP, Inc.		
Appraisal Inspection Report - Used Car		
Owner	Address	
Make of Car	License No.	
Allowance		
Car to be turned in as appraised not later than 191		
With full factory equipment of tools etc., and the following extras:		
CAR WILL NOT BE ACCEPTED UNLESS TURNED IN AS SPECIFIED ABOVE.		
Owner	Address	
Make	Model	Type
Color - Body	Gear	Car No.
Approximate Resale Price \$	Repair Cost \$	Motor
Inspector	Salesman	In Trade
Frame	Steer. Spdl.	Carpet
Axle Ft.	Wheels	Top
Axle Rear	Brakes Ft.	Curtains
Motor Support	Brakes Em.	Lamps
Valves	Springs	Paints
Starter Chain	Fenders	Delco or Mag.
Water System	Run. Boards	Generator
Vacuum Tank	Windshield	Battery
Carburetor	Body	Indicator Bat.
Clutch	Upholstry	Indicator Oil
Transmission	Rear Glass	Starter Switch
Universal	Side & Door Glass	Tires Ft. R.
Drive Shaft	Door Handles	Tires Ft. L.
Differential	Lever Handles	Tires R. R.
Steer. Gear	Floor Bd. Ft.	Tires R. L.

Fig. 2—Form Printed on Card for Checking up Original Appraisal Details of Used Car When Machine Is Finally Turned in.

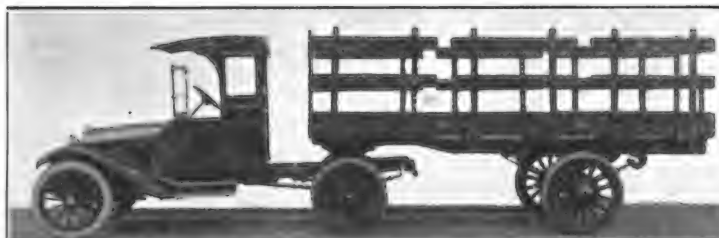
lances, taxicabs, combination hearse and casket car, hearse, seven-passenger funeral car, dumping coal truck, 10 different types of panel body jobs on the standard commercial chassis and 10 different types of truck bodies. All their various types of bodies are built under their own designs and directions.

On their 1½-ton truck they use the Torbensen one-ton axle, capable of a 50 per cent. overload, with four-inch channel Carnegie steel frame, Phineas Jones wheels, Merrill springs and Kinsler-Bennett universal joint and propeller shaft. On their two to three-ton trucks they

unit to the Dodge chassis is different from that used by the majority of the attachment companies. They have the truck frame made the same width as the Dodge frame and then spring the Dodge frame inside the frame of the truck attachment and hot rivet the frames together, thereby adding strength to the construction. Their truck and tractor

great majority of Dodge owners whose faith in the performance of the passenger car was sufficient to prove to them that it would make an efficient truck or tractor, encouraged them to proceed with the development of their commercial car line. The result of this development is that, even under the present adverse conditions they have not been able to complete enough jobs to meet the demand.

Their commercial car department is in charge of a mechanical engineer and a capable senior salesman. The engineer has charge of the construction of the trucks and the fol-



Top View, Dodge Tractor and Bishop-Mc McCormick Trailer; at the Left, Ambulance on Extended Dodge Chassis; at Right, Dodge-Bishop-McCormick One-ton Truck.

use the two-ton Torbensen axle, capable of a 50 per cent. overload, with five-inch channel Carnegie steel frame, and the same makes of other parts, except of heavier construction.

The standard wheelbase of their 1½-ton and three-ton trucks is 135 inches. This will accommodate a body with 9 to 10 feet of loading space back of the driver's seat. In cases where the purchaser desires more loading space they furnish a truck chassis with a wheelbase up to 160 inches. On this size chassis they use a split propeller shaft with self-centering bearing. The object of the split propeller shaft is to overcome any whip that would develop in an unusually long propeller shaft. On the tractors they use the same construction for the five-ton tractor that they use on the 1½-ton truck, except that the wheelbase is 110 inches, and the same construction for the five-ton tractor as the three-ton truck, with a 110-inch wheelbase. They also use the Martin rocking fifth wheel. The gear ratio on the 1½-ton truck and the three-ton tractor is eight to one and on the two to three-ton truck and the five-ton tractor the gear ratio is 9 to 1.

When a purchaser wishes to use his old horse drawn truck as a trailer they have found it necessary, in some cases, to lengthen the wheelbase of the tractor to give room for the extra wide body to clear the cab of the tractor when making a complete right angle turn, such as in the case where the trailer is backed up and the tractor is turned at right angle to the trailer, so as not to occupy too much of the street.

Their method of attaching the truck

attachments have been made locally under their own supervision, but they are now using large quantities of Graham Brothers units as standardized for Dodge Brothers commercial cars.

On their ambulance jobs they lengthen the Dodge standard commercial chassis to 138 inches and on the combination hearse and casket car the wheelbase is extended to 144 inches.

When Bishop, McCormick & Bishop, Inc., started to develop their commercial car line, a number of people told them that it could not be done. However, a

lowing up of special body work with the different body companies. He takes charge of the truck inspection service and directs the school for both the passenger car and truck operators, besides is at the service of any of the salesmen for consultation with prospective customers, advising them how to solve their trucking problems.

The volume of their commercial car business each month is approximately 25 per cent. of their total retail sales. Their associate dealers also attain excellent results in selling commercial cars.



Section of Commercial Car Department.

Car Makers to Take on 100 Per Cent. War Work

War Industries Board Says This Schedule Should Be In Force Not Later Than Jan. 1, 1919—Little Material For Passenger Cars Available After That Date

The uncertainty that has enshrouded the outlook for the passenger automobile for the past year is apparently cleared up by the latest announcement of the War Industries Board that is interpreted to mean that after Jan. 1, 1919, the motor car manufacturers must be in a position to do 100 per cent. war work and that such a situation would automatically cut off the production of automobiles to a large extent.

The letter in which this statement was made was addressed to the National Automobile Chamber of Commerce and was in response to the proposal made to the board on the part of Hugh Chalmers in behalf of the organization of car manufacturers. Mr. Chalmers gave the board the proposal of the manufacturers to cut production 50 per cent. of their 1917 rate, which was decided upon at a recent meeting of the directors of the N. A. C. C. held in Detroit.

The whole situation as the government views it is summarized in the letter of the War Industries Board, which is as follows:

"We are in receipt of and have given very careful consideration to your communication of Aug. 8, embodying the resolution passed at your meeting at Detroit, Tuesday, Aug. 6. We note that the manufacturers have voluntarily agreed among themselves to curtail the production of passenger cars 50 per cent. While this is clearly a step in the right direction and furnishes a basis for each and all of the manufacturers without further delay to make appropriate reductions in selling, general and overhead expenses, still it is only a step, and further curtailment is inevitable.

"Fairness to your industry impels us to frankly state that the situation as it is presented to us today indicates very clearly that there will be little, if any, of the principal materials required in the construction of passenger cars available for non-war industries after the war requirements shall have been provided for, and the war industries board cannot at this time make any promise whatsoever regarding the supply to your industry of steel, rubber or other materials for any definite period in advance.

"We strongly believe that it is to the best interest of your manufacturers and all other manufacturers of passenger automobiles to undertake to get on 100 per cent. war work as rapidly as possible and not later than Jan. 1, 1919, for in no other way can you be sure of the continuance of your industry and the preservation of your organizations."

"We regret that we are not in a position at this time to give you a more definite reply to your communication of the 8th instant due to the fact that the data and information which on July 16 we requested you to promptly furnish

us has not yet been received. As soon as received prompt and appropriate action will be taken of which you will be immediately advised.

"No material will be furnished to any passenger automobile manufacturer until it has filed with this board a sworn statement embodying the information requested on July 16 coupled with an agreement to furnish this board with such additional information from time to time as it may require.

"Yours very truly,
"WAR INDUSTRIES BOARD."

No Limitation On Sale of Gasoline

Fuel Administration and War Industries Board Deny That Any Restrictions Have Been Approved.

The quite general adoption of the plan recommended by the National Automobile Dealers' Association for the closing of service stations and gasoline distributing stations on Sundays and after 6 o'clock at night, which plan was approved by the conservation committee of the War Industries Board, has invoked a statement from the Fuel Administration and War Industries Board, which was issued to dispel the belief that any such campaign had been authorized from government sources.

This statement, which appeared under date of Aug. 2 in the government publication, the "Official Bulletin," is as follows:

"The attention of the War Industries Board of the United States Administration has been called to the wide preva-

lence throughout the United States of a mistaken impression that some order or recommendation has been issued from Washington with respect to the sale of oil and gasoline. In some places local automobile dealers' associations have even issued circulars laying down the rule that dealers in oil and gasoline must make no sale of these products on Sundays and holidays or after 6 p. m. on other days, and stating it is an order from Washington.

"No such order or recommendation has been issued by any governmental authority or with any governmental approval. The fuel administration has urged that wasteful practices in the use of oil and gasoline be stopped and that all reasonable and proper measures of conservation be observed. No limitations, however, have been placed upon the sale of these products.

"It is not intended to interfere in any way with the activities of automobile dealers' associations or others who, after consideration of the local conditions, may seek to bring about some limitation upon the hours during which oil and gasoline shall be sold to the public; but it is desired that it be clearly understood that no orders or recommendations have been issued by any government authority upon the subject."

GEAR MANUFACTURERS WILL HOLD MEETING NEXT MONTH.

The semi-annual meeting of the American Gear Manufacturers' Association will be held at the Onondaga Hotel, Syracuse, N. Y., Sept. 19, 20 and 21. Announcement of the program will be given later.

BUDA VALVE LIFTER.

If an engine is to deliver its full capacity on a minimum of fuel, careful attention must be given to the matter of keeping the valves in proper shape.

The removal of valves for inspection or grinding is a difficult task with the tools usually furnished as part of the equipment of trucks and tractors. Added to this there is the liability of doing serious injury to the valve stems or push rods.

To simplify the removing of valves the Buda company have placed on the market a valve lifter, which is shown in use in the accompanying illustration. This tool can be used on all models of Buda engines except the RU. By substituting a smaller block to fit the port hole openings the tool can also be used on that model.

Prices and descriptive circular will be sent on application to the Buda Co., Harvey, Ill.



Buda Valve Lifting Tool Designed for All Models of the Buda Engine Except the "RU."

The Chalmers 6-40 Engine

This is the 26th article in a series dealing with the overhaul of used cars which are being published in response to many requests from subscribers. With the present outlook indicating even greater activity in the overhaul, repair and renovation of used cars these articles will be continued for the purpose of demonstrating that the automobile has extensive service value, which can be greatly increased by a slight outlay for replacement of parts and adjustments.

By C. W. AGNEW.

This engine is one of the most complicated built and is a very powerful engine when working properly. It is so much different from the ordinary type of engines that it is a hard task to find re-

outside of the crank case through a pipe clear around the front of the engine to a point directly opposite the pump. The outside oil line gives the oil a chance to cool before going to the bearings. At

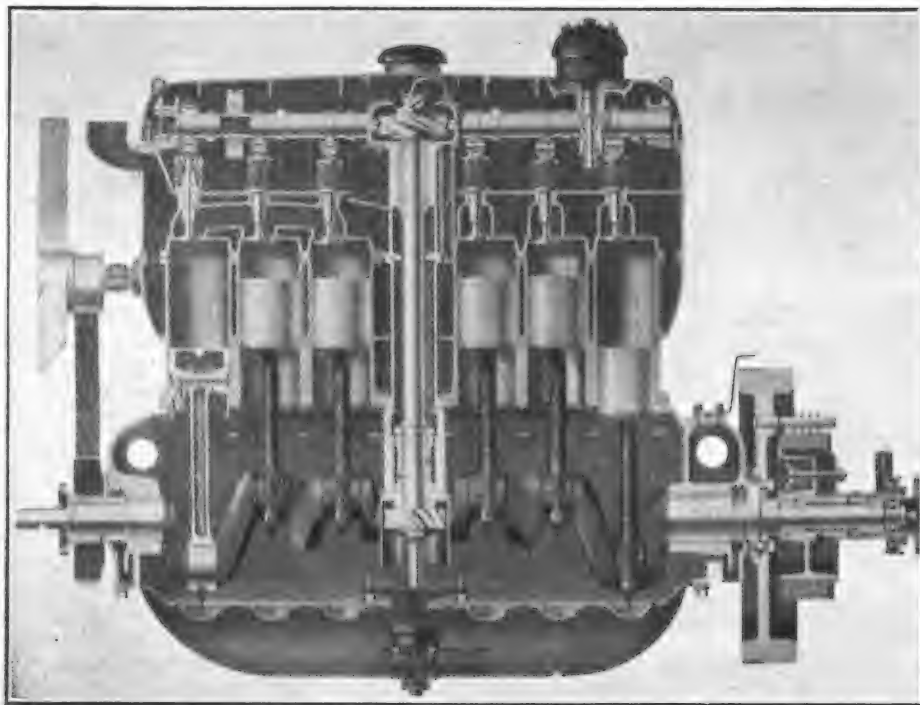
this travels through a channel cut in the bearing to an overflow oil line at the top of the bearing cap. This line should be so bent that oil will pour directly on the spot where the two gears mesh. Oil returns to the crank case through a large opening directly under the cam gear, down and over to the vertical shaft and follows this shaft down to the crank case, thus lubricating the lower vertical shaft bushing and gear as it returns to the starting point. When these engines were originally built there was a wire screen placed in the large oil return hole in the head to strain the oil, but these screens should be removed as they are very liable to clog and prevent the oil from returning to the crank case and endangering all the main and connecting rod bearings.

The pipe that leads down from the cross connection carries oil to the four main bearings and the overflow pipe from the front and rear bearings should be bent so that oil will overflow into the inner or splash pan, as this is the only means the connecting rods have of getting oil.

The third and last branch of the cross leads to a pressure gauge. If there is no oil pressure, look for loose connections, cracked or punctured oil lines, loose main bearings or a damaged pump.

This is the original method of oiling, but has in a good many instances been found to cause too much smoke, so I will try and describe how the system may be improved and this defect remedied.

Drill a $\frac{3}{4}$ -inch hole in the Welch plugs in the ends of the camshaft, so as to allow oil to come out of the ends instead of it having to pour from the cams down over the valves. Drill two $\frac{1}{4}$ -inch holes in extreme ends of cam front and rear bearings to allow the oil from the ends of camshaft to return to the bottom of cylinder head. These holes must be drilled one on each side of each bearing about half way up from the bottom so as to cause oil to flood across the ends of the shaft, keeping it running in oil. Before starting to drill these holes run your finger underneath the bearings in the place where you intend to drill, and you will feel a reinforcing wall. Make your center punch mark so that the drill will break through just in position to clear it. Also when drilling the front bearing be very careful to stop as soon as you break through or you may drill through clear



The Chalmers 6-40 Engine Showing Valve Mechanism and Assembly.

pair men that are capable of understanding it.

The first thing to do is to forget that this engine is different from any other and that it is just an ordinary four-cycle engine, having a crankshaft, camshaft, cam gear, valves and rocker arms. The difference being in that the camshaft is at the top of the engine and of course the crankshaft at the bottom. A vertical shaft running from the crankshaft up through the cylinder block and cylinder head meshes at the lower end with a bronze gear on the crank gear and with an upper gear of steel that meshes with the cam gear.

With the oiling system in this engine the greatest trouble arises from too much oil reaching the cylinders, thereby causing smoke and fouled spark plugs. At the left side of the engine at the bottom of the vertical shaft is the oil pump. Oil travels from the pump directly to the

this point it leads to a cross connection and from there goes in three directions, up, down and straight back towards the rear of the engine. Taking the feeds in the order named, the oil travels up through a short oil line to an elbow in the head of the engine and through the head up the rear center cam bearing. From there it runs to the inside of the hollow camshaft through a small hole and so floods the whole length of it, oil escaping through small holes drilled in the shaft to lubricate all the bearings and rocker arm rollers and also the bronze timing gears.

Main Oil Feeds.

It is now seen that oil is supplied to everything in the engine head except the upper vertical shaft gear and the cam gear. Oil comes to these directly from the rear center cam bearing. Of course there is a large amount of oil that will not go into the hole in the camshaft and

into the water jacket. Drill $\frac{1}{8}$ -inch hole underneath the cam toe to allow oil to come from center of camshaft to lubricate the toe. This hole must be drilled so as to just miss the key in the collar or it will be impossible to drill to the center of camshaft.

Piston Lubrication.

Enlarge the oil holes in the pistons to $\frac{1}{4}$ of an inch. See that piston and rings fit properly, also that cylinders are not tapered or out of round. After following these instructions if the engine still smokes, send it to a Chalmers service station for four metal plates called "baffle plates." These plates are shaped so as to fasten under cylinders No. 1-3-4-6, and prevent some of the oil from throwing up into the cylinders. This covers what I consider the most important part of the engine, and while one may think that I have given a lot of unimportant facts, there is no other way to stop this trouble.

Overhauling the Engine.

It is not necessary to take the engine from the chassis unless one wants an absolute overhaul done. I will state how to rebuild the engine after it is taken from the chassis so that one may use whatever part of these instructions needed.

In removing the radiator, remove the four cap screws that fasten the upper water elbow to the engine, and allow these connections to stay upon the radiator. Tag all the wires, rods, etc., so as to know how to put them on again. Remove the inlet manifold, together with the carburetor. Free the engine from the mud pan, engine bolts, clutch throw out yoke and universal joint. Drain off all the oil. Take off the cover of the engine. Remove the nut which holds the cam brake to the head. Take out the camshaft, being careful not to lose or change any shims while doing so and put the bearing caps and nuts back in their places as soon as the shaft is removed. With a center punch mark the rocker arm brackets so as to know how to put them back over the same valve from which they were removed. It is not necessary to remove the rocker arms from their brackets, just take a 31-inch wrench and run the nuts up to the top of the stud, hit them a good blow to drive them down so that the nut touches the bracket. Now remove all the bracket nuts and they can be lifted out. Take off the upper vertical gear and then the sleeve which gear sets over. Remove all the 7/16 nuts in the head and also one at each corner, which can be taken off from the outside. Disconnect the short oil line under the exhaust manifold and turn the elbow to the left as far as possible so as to prevent dirt getting in while you are working on the head. Two men can now lift off the head and then the rest of the engine can easily be taken from the chassis. Have a stand ready so that the engine can be turned bottom up while the work is being done.

Remove the oil and splash pans and the oil line that leads to the four main bearings. Loosen the packing nut on the outside oil line where it goes through the crank case and disconnect the oil

line from pump. Remove the two $\frac{3}{4}$ cap screws and the pump and screen can be lifted out. Pull the pistons and rods after first making sure that the numbers on the rods and caps are on the same sides and looking into pistons to see that the wristpin set screws are all towards the front of the engine.

Remove the lower vertical gear with a puller. If the vertical shaft is too loose on the lower bushing, remove the three screws in the bottom and the bushing can then be removed from the case by tapping on upper end of the vertical shaft with a soft hammer. It is then an easy matter to put in a new one, which must be reamed out $1\frac{1}{4}$ inches. Make sure there is a nice free fit before putting bushing back into place. Also while the shaft is out try and fit in the upper bushing the same way. Next remove the clutch and flywheel, being careful not to lose the three spacing rings between flywheel and shaft, as these rings take the weight off the flywheel from the studs and also hold it on center.

Remove the generator chain guard and fan pulley. Then remove or loosen the generator so that the chain can be taken off. Remove all main bearing caps and lift out the crankshaft, laying it in a safe

Vertical shaft reamer $1\frac{1}{4}$ inch.

Wristpin reamer 13/16 inch.

End play in crankshaft not over .006 inch.

Piston side play, .004 inch to .006 inch.

Rings should fit snugly, pushing them all the way through with a piston.

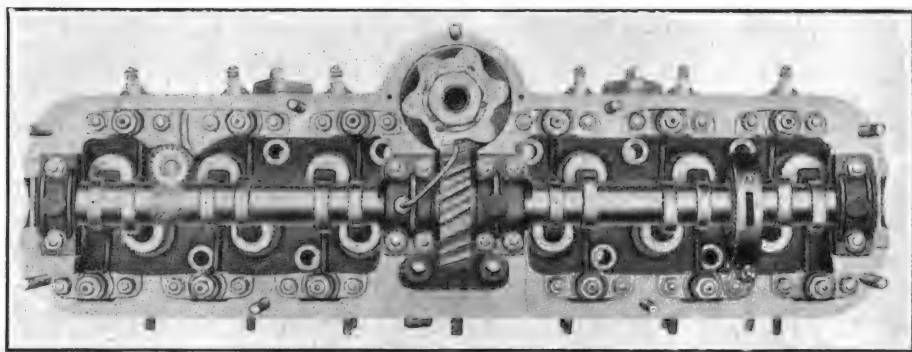
Set screws in pistons should be toward the front of engine.

Hole in sleeve for upper vertical gear set screws 17/64.

Wristpin should fit bushings just loose enough so that rod will fall over of its own weight.

Main bearings should be just free enough to allow the shaft to be jerked around with the hands, when but one bearing is tight and connecting rods are not in. Taking it for granted that the bearings are all good we will now build up the engine.

Lay the crankshaft in the case, adjust the main bearings and put on the fan belt and then the generator chain. The flywheel comes next, which will only go on one way. When the flywheel is attached and the main bearings all tight, take the crank and the shaft should easily be spun around. Make sure that there are corks in both front and rear bearings and fit them so that they do not



The Motor with Cylinder Head Removed Showing Staggered Valve Installation.

place where it cannot fall and be injured. Remove the old packing from the front and rear bearing caps as new packing must be put in when the engine is reassembled. Wash the whole engine in kerosene and wash all parts perfectly clean.

Reboring Cylinders.

If it is found necessary to rebores one cylinder, rebores all of them and fit all new pistons and rings, but do not have the bore exceed 3.145 of an inch or you will be unable to get pistons to fit, which will necessitate purchasing a new cylinder block. This amount allows .020 of an inch for grinding, as the standard block measures 3.125 of an inch.

To build up the engine again and have it perfect as possible the following rules are suggested:

Crankshaft not to be sprung or out of round over .002 inch.

Crank and cam gears should indicate not over .0003 inch.

Camshaft not to be sprung over .002 inch.

Camshaft not to be sprung out of round over .001 inch.

Flywheel should indicate either way not over .006 inch.

quite touch the shaft or oil will leak out. Pack the bearings with candle wicking and shellac. Put back the pistons, spacing the rings three ways and adjust the connecting rods so that they will push over with the hand and go back with a snap. Look into the pistons and see that the rod does not touch the boss, as this will denote that the piston is out of line and that the rod must be straightened. Attach the lower vertical gear, making sure that the key enters the keyway in the gear.

Drive the gear on with a piece of wood so as not to injure it. Set on a plain washer and then screw the nut down as tightly as possible so to take out all the end play from the shaft. It is now impossible to turn the crankshaft around with the hand crank. Loosen the nut about three-quarters of a turn and use the wooden block against the bottom of the vertical shaft, giving it two good blows and then try the crankshaft to see that it turns freely. Then put on the lock washer and tighten down the second nut and if the crankshaft still turns freely, lock the nuts by bending two lugs

(Continued on Page 38.)

Thermostatic Control of Generator Charging Is Developed by Remy.

By GEORGE V. McMAHON,
Assistant General Manager Remy Electric Co.

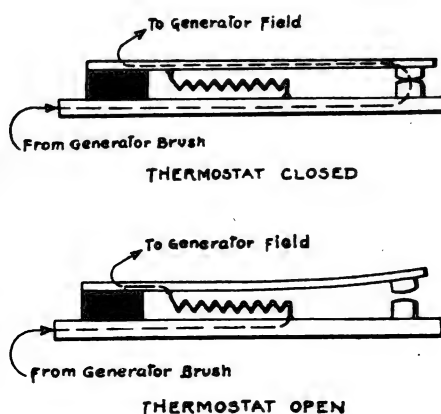
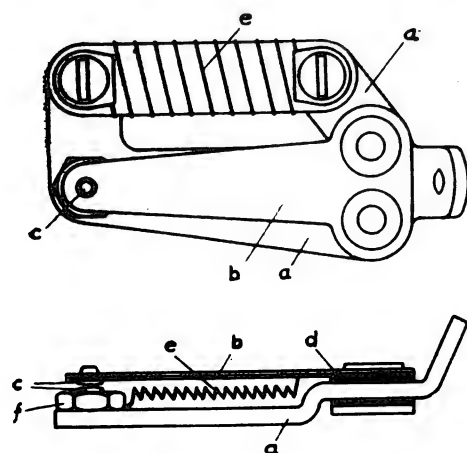
It is a matter of common knowledge among motorists that more current is required for lights and for the starting motor in the winter than in the summer, and as a result the battery is often in a drained condition. The condition of the roads and streets in winter is such that cars are driven more slowly, and again the battery suffers if special provision is not made to keep the battery charged.

The problem of supplying a high charge rate to meet the demands of winter driving would be simple if the

A simple and positive acting thermostat has been mounted on the brush rigging in a position where the effects of atmospheric temperature and the heat produced in the generator windings are averaged.

Mechanically, the thermostat is constructed as illustrated.

A stamped steel bracket carries a resistance unit, a silver contact point and a thermal blade, insulated from the bracket and carrying a second silver contact point.



battery were capable of standing up under a continuous high rate of charging.

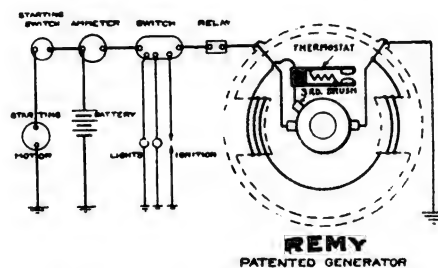
When a battery is being charged its temperature tends to rise above that of the surrounding atmosphere. The higher the charge rate and the more nearly charged the battery the greater the increase of temperature produced. The effect of this increase of temperature is to evaporate the water from the battery, and if carried too high to cause shedding of the active material of the plates, thereby reducing the capacity and greatly shortening the life of the battery.

With a reduction in the demands for current for lights and starting in the summer the battery is in a more nearly charged condition, and as the atmospheric temperature is higher, the charge rate must be lower if the battery is to be kept from overheating.

To meet this variation in demand for current the Remy generator has been designed for large current capacity and provided with a thermostat control, which automatically reduces the generator output to a safe value for summer conditions.

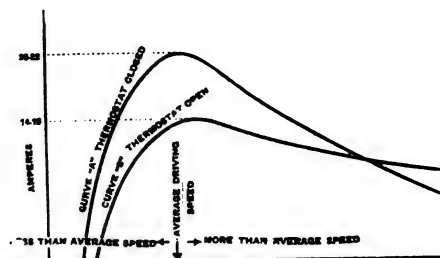
The designers of the Remy thermostat control have taken advantage of the fact that generators, as well as batteries, produce heat in a definite relation to the rate of current flowing, and that the temperature attained in the generator is furthermore dependent on the prevailing atmospheric temperature.

The contact point in the thermal blade is held against the similar contact in the bracket, by the spring tension of the blade itself at low temperatures. The blade is, however, made of a strip of spring brass welded to a strip of nickel steel—a combination which warps when heated, due to the greater expansion of the brass. Thus the contacts are separated by the bending of the blade whenever the thermostat is heated to approximately 175 degrees Fahrenheit.



It will be seen from the illustration above that when the thermostat is closed the field current takes the low resistance path through the contact points, but when the thermostat is open the field current is forced to go through the resistance unit. By this automatic insertion of resistance in the field current the generator output is reduced to a predetermined value.

To illustrate the operation of the thermostat by referring to the curve in ac-



companying cut it will be seen that at normal speed the generator output will be 21 or 22 amperes after starting with a cold machine. With atmospheric temperatures around 70 degrees Fahrenheit the thermostat will open after two or three miles, which is sufficient time to make up for the amount of energy taken from the battery in starting. When the thermostat opens the output will drop to 14 to 15 amperes at average driving speeds. In very hot weather the thermostat will open much quicker. In extremely cold weather the thermostat will remain closed, insuring the continuous high generator output needed to meet the increased demands made by the starting motor, and the increased burning of the lights.

In addition to correcting the discrepancy between winter and summer demands for current, the thermostat control makes it possible to keep the battery fully charged under unfavorable conditions, such as an exceedingly large number of starts, and use of the car mostly for night driving.

This thermostat control is supplementary to the well known third brush regulation, which keeps the charge rate from rising above the predetermined maximum of 20-22 amperes for a cold generator when the car is operated above average driving speed.

PROPER SPRING LUBRICATION.

One of the most annoying things about an automobile is a squeaky spring. When a motorist complains about it to his garage man or to the dealer who sold him the car, it is evident that he has not been using the right kind of lubricant. Plain oils and greases squeeze out and permit friction between the bare metal of the leaves. The proper lubricant is one that will form a tough, enduring film between the leaves, preventing metal-to-metal contact.

The Joseph Dixon Crucible Co., manufacturers of Dixon's Motor Graphite, give this advice about lubricating the springs: Jack up the car so that all the weight is off the springs and spread the leaves apart with a screw driver or instrument provided for that purpose. Then smear a creamy mixture of kerosene and motor graphite between the leaves.

Springs thus treated will ride much easier and will be entirely free from squeaks. If the graphite is of pure flake variety it will adhere to the surfaces, filling up and smoothing over the minute irregularities and will not squeeze out.

Cut in Tire Production Requested

Manufacturers Asked to Reduce Output of Casings and Tubes During August and September to 50 Per Cent. of Amount Produced in Same Period in 1917

Curtailment of the amount of crude rubber available for manufacture into pneumatic automobile tires is indicated from the results of the meeting of all branches of the rubber industry held recently in New York, when representatives of the War Industries Board explained the situation as it affected their business and requested the manufacturers to cut their output of pneumatic tires for pleasure automobiles during August and September 50 per cent.

The meeting was held under the auspices of the Rubber Association of America, with B. G. Work, president of the B. F. Goodrich Rubber Co., presiding.

The allocations of rubber that have been in force, so far as importations and manufacturing are concerned, during May, June and July, are to continue for another 60 days, during which period it is expected that the manufacturers of rubber goods will succeed in placing such restrictions on their output as to comply with government requirements. Transportation of rubber have been restricted by the War Trade Board to 100,000 tons of crude rubber per year and during 1917, 160,000 tons were consumed, and the rate of consumption has grown so that more than twice that quantity could be used this year if supplies were available. Manufacture of pneumatic tires use about 70 per cent. of all rubber imported.

Government requirements have been responsible for the increase in the demand for tires and rubber. The number of orders for truck tires have been more than quadrupled. Under the plan for controlling the industry during August and September all goods ordered by the United States and the Allied governments will be manufactured in full and the remaining supply of crude rubber will be manufactured at the rate of three-eighths of consumption for the corresponding two months' period of 1917. The situation was summed up in a letter written by George N. Peek, commissioner of finished products for the War Industries Board, to Bertram G. Work, chairman of the war service committee for the rubber industry.

Following the meeting there was considerable discussion in the industry as to the effect of the new situation upon the smaller manufacturers, as in many cases with this class of producers the curtailment plan would mean a severe hardship if not entire cessation of production.

The following is the letter of the War Industries Board in part:

"Your industry has operated during the months of May, June and July on the plan of allocation of crude rubber

under a limited tonnage arrangement with the War Trade Board and as additional information is necessary before finally determining upon the allocation for August, September and October (which information you are now compiling) it has been determined that for the months of August and September substantially the same arrangement and percentage of allocation will continue.

"Your industry should understand that the need of conserving shipping space is as great, or perhaps greater than when this matter was first taken up last April. We understand that while approximately 25,000 tons were licensed for import during the months of May, June and July (although considerably more than this has been received), approximately 50,000 tons will have been consumed by the industry. It is obvious that something radical must be done at once to curtail the consumption of rubber and we feel sure we may rely upon the support of the industry in taking such immediate steps as may be necessary to conserve the present stocks of rubber now in the country and those due to arrive.

"The government departments are making every effort to determine requirements of crude rubber for essential war and business purposes, and as soon as this information is at hand steps will be taken to insure the import of sufficient rubber to meet those requirements.

"As a means of conserving the stocks of crude rubber now in the country, your committee has suggested curtailment of the production of pneumatic automobile tires and tubes during the months of August and September, and we request you

"(a) To pledge the manufacturers of pneumatic tires and tubes to restrict the production in tonnage of rubber consumed and in numbers of casings and tubes to the extent of 50 per cent. of the production for the corresponding months of August and September of last year. But in no event shall the manufacture of pneumatic casings and of tubes during the month of August, 1918, or the month of September, 1918, exceed 50 per cent. of the monthly average for the year 1917 both as to amount of rubber used and number of pieces produced.

"This restriction is exclusive of government business.

"(b) That you carefully consider restricting the manufacture of all other articles involving the use of rubber, as every possible saving should be made.

"You are thoroughly familiar with the industry to which we look to patriotically and conscientiously cut out the consumption of crude rubber at every point where it can be done without injury to the nation's welfare.

"A curtailment such as mentioned above, in the production of pneumatic tires and tubes and other articles, will not accomplish the desired results unless some plan is evolved for limiting and regulating the use of motor vehicles and we expect the use of rubber tires will be restricted except for actual war and essential business purposes. We are not at liberty at this time to announce our plans for accomplishing this purpose, but will do so in the near future.

"Every necessary step should be taken to discourage and prevent hoarding of the finished product by manufacturers, wholesalers, dealers and consumers, and we ask you—

"(a) To evolve some plan, and put it into effect, which will accomplish this end, and to see to it that if any one of these factors are guilty of hoarding, that steps be taken to prevent their securing additional supplies:

"(b) That advances in prices be prevented.

"We look to you to see that this is accomplished.

"Before arrangements are concluded for the importation of rubber after the month of September, with your co-operation we expect to evolve definite plans which will accomplish the purposes we are after; i. e., the conservation of every foot of shipping space possible by the conservation and restriction of the use of rubber.

"We ask that you facilitate your final arrangements for co-operation with the conservation division in making such changes in the manufacture and distribution of your product as will result in the conservation of rubber during the period of the war.

"We anticipate your complete co-operation in all of the above matters and assure you of our desire to see that the industry is provided with the necessary raw materials to take care of the war and essential civilian needs as soon as that can be determined, and give you our further assurance that we desire to curtail the industry only insofar as it may become necessary to meet the war needs."

PURITAN MACHINE ADDS BROC-

ELECTRIC TO ORPHAN LIST.

The latest addition to the long list of orphan cars, of which the Puritan Machine Co., 10th and Lafayette Aves., Detroit, Mich., supplies parts, is the Broc-Electric, formerly of Saginaw, Mich. The entire stock has been removed to Detroit.

MANY ADDITIONAL MILES ON RETREADED TIRES.

"If motorists were better acquainted with the advantages of having their tires retreaded when not worn through the carcass, many miles would be added to tire life," stated Mr. Dwyer of the Wakefield Tire Co., Wakefield, Mass.

"A retread can greatly extend the usefulness of a tire carcass that has had good care, but a tire that has been run 'soft,' overloaded or tread cut, or mistreated in other ways, cannot profitably be so repaired.

"But where the tire has had good care and the fabric is uninjured, a retread is a profitable investment. Many thousands of miles are added to tire life in this manner. A new tread can be built into a tire that will greatly increase its length of service.

Vulcanizing treads on used tires has reached so great a degree of perfection that even racing drivers are using retreaded tires. In the past racing drivers have never used tires that have undergone any kind of repairs—only new tires were considered safe. But that retreaded tires are a success on the race track is abundantly proven in the experience of Louis Chevrolet, who during the past winter season won several races on the western coast on retreaded tires.

"In the interest of conservation every motorist should first consider the advantages of a retread before sending to the scrap heap his old tires. The charge is about one-third the cost of new tires with a guarantee of 3000 additional miles."

QUESTION OF AUTOMOBILE TAX STILL UNDER DISCUSSION.

What final form of taxing the motor car owner will be decided upon by Congress it is not possible as yet to predict. All revenue measures originate in the House of Representatives and then go to the Senate, which may disagree radically with the House's interpretation of the situation. Then the measures passed by the two branches go to the conferees.

President David Jameson of the American Automobile Association recently presented to the two committees the case of the car owner in communications to Chairman Kitchin of the House Ways and Means Committee and to Chairman Simmons of the Senate Finance Committee. Mr. Jameson commented upon the fact that the motorist now receives extensive taxation attention from the several states, referred to the certainty that any impost on new cars would be passed along to the consumer, and contended that any charge on the original cost of used cars would be manifestly unjust. Mr. Jameson asserted that it would be as fair to tax coal as gasoline, since both are fuel producing quantities.

Several days after the filing of Mr. Jameson's communication the House committee announced that it had decided to base the Federal tax on cars in use on a horsepower basis instead of on the original cost.

Harry Dunn Heads Rubber Section of War Board

Head of Fiske Rubber Company Will
Supervise Country's Rubber
Industry.

Harry T. Dunn, president of the Fiske Rubber Co., Chicopee Falls, Mass., has been appointed head of the newly created rubber section of the War Industries Board. This position will require most of his time and while he will not give up his duties with the Fiske Rubber Co., he will make his headquarters at Washington.

E. H. Broadwell, vice president of the Fiske Rubber Co., has succeeded Mr. Dunn as a member of the War Service Committee of the Rubber Association of America.

HUBBARD ASSORTED SPRINGS FOR GARAGE AND REPAIR MEN.

Every garage and repair man finds a constant demand and need of small springs, cotters, washers and other similar parts. Because these parts are seemingly unimportant he neglects to provide an ample stock with the result that much time and labor is wasted and often a makeshift repair or adjustment is turned out, which later costs him prestige as well as money.

After studying the needs of this branch of the automobile trade the M. D. Hubbard Spring Co., Pontiac, Mich., have made up an assortment containing a large variety of springs that can be used for purposes of this kind, either as they are made or by slight alteration. This assortment contains 16 pounds of springs and sells for \$2, which is a lower price per pound than the average assortment, as it contains a much larger quantity. It is sent on approval or subject to inspection to responsible buyers or to anyone on deposit subject to return. When sent on approval the buyer is asked only to pay transportation charges one way in consideration of the privilege of inspection and acceptance or rejection.

The McMillan Bed is designed to provide a comfortable spring bed while touring and is placed over the back of the car seats, providing room for two persons. It weighs 13 pounds and rolls into a bundle two feet long and four inches in diameter. It is made in a number of models to fit the various makes of cars.

Manufactured by the Auto Bed Co., Bellingham, Mass. Price, \$10 to fit Fords, Chevrolets "400" and Baby Overlands.

GASOLINE PRODUCTION IS GREATER THAN LAST YEAR.

The average daily production of gasoline during May of this year was 10,302,942 gallons, an increase of 523,070 gallons per day over April. The figures just issued by the Bureau of Mines also shows that the stock of gasoline on hand on the last day of May was 460,637,479 gallons, which is less than was on hand on April 30, when the stock was 509,197,134.

The production of crude oil in May totaled 28,510,698 barrels, giving a daily average of 919,700 barrels. The stock of crude on hand on May 31 was 11,824,633 barrels, as against 12,600,062 barrels for April 30.

ROEDDING SIGNAL TO BE PATENTED THROUGHOUT WORLD.

K. G. Barkoot, distributor of Roedding Signal Tail Light, has made application for patents on the Roedding signal light in all of the main countries of the world and has received advices of the allowance of patents in several of these with notification of the receipt of the claims in all others. Patents will be issued in one form and another in England, Australia, France, Belgium, Italy, Russia, Japan, Spain, Brazil, Argentine Republic, Chili and in South Africa. Three applications, one for trade mark, one for design and one for mechanical patent with three other protective patents have already been made and others will follow, as it is the intention of Mr. Barkoot to protect in every way and in every country the patents of Roedding.

JORDAN MOTOR CAR CO. PAYS 8.6 PER CENT. DIVIDEND.

The Jordan Motor Car Co. on Aug. 1 paid a dividend of 8.6 per cent. to the holders of the original Jordan preferred. Jordan production, which was originally limited to 2000 cars annually, has proceeded at that rate since the first cars were shipped, yet on Aug. 1 the company was several hundred orders behind in deliveries. The company has been turning over its capital practically every 30 days, and in the July period the earnings were at the annual rate of 160 per cent. on the capital invested.



\$12.50 for models to fit the Dodge, Buick, Overland, Studebaker. \$15 for seven-passenger cars.

Pan Has Compact Engine and Sleeping Car Body

THE first announcement of a 1919 model passenger car comes from the Pan Motor Co. of St. Cloud, Minn., manufacturers of the Pan, and it is of unusual interest, as while the majority of makers are continuing their old models, this company is to introduce many new features.

Production will be confined to one chassis, the same as was shown at the various shows last winter, and this will be equipped with touring, roadster and sedan bodies.

It will not be an assembled car like the 1918 model, but will be built complete in the company's own plant. It was designed by Victor Gauyreau, chief designing engineer of the company, and although there is nothing radical in its design, many new ideas are incorporated. The most interesting feature of the



Pan Tourist Sleeper Model Has Many Novel Engine and Body Features and Seating Arrangements of Conventional Type.

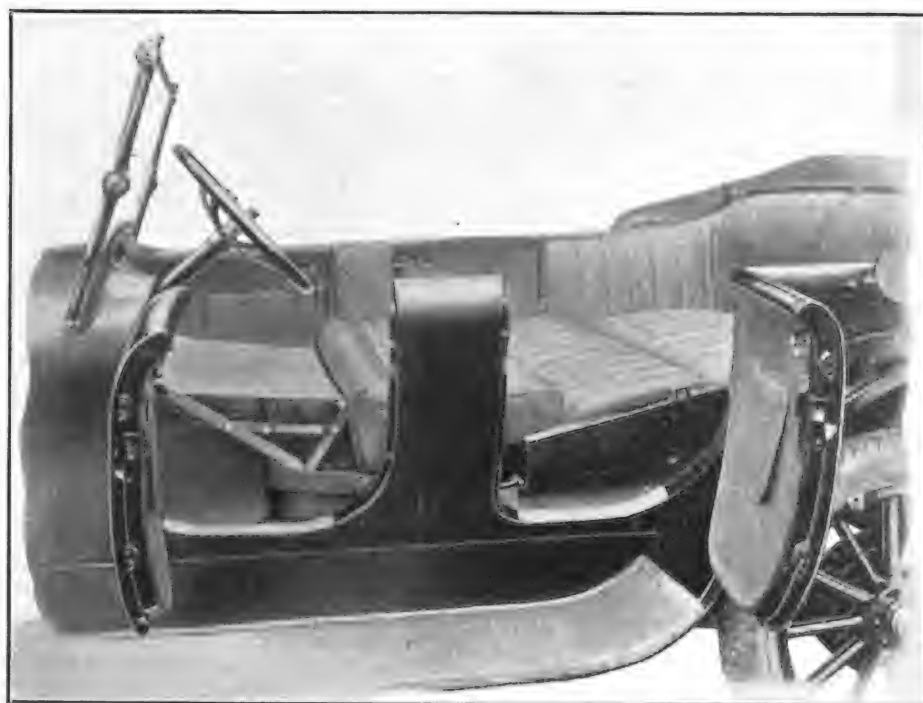
on two ball bearings. The crank pins are unusually large for this size of mo-

cial counterweight, a very compact and rigid barrel type crank case is employed, being cast en block with the cylinders. Intake and exhaust valves are both opened by the same camshaft; the cams are integral with the shaft, which is carried in three babbitt bearings. The intake valves are operated through straight push rods, all valves being adjusted at the side the same as in a standard "L" head type motor.

Thermo-syphon water circulation is used, the water entering at the center of the left side of cylinder block and leaving from the front end at the top. There are large water jackets all around the motor and free water circulation around the spark plugs and valves. Lubrication is of constant level circulating system. The reservoir is in the pressed steel oil pan, which is readily removable, and due to the type of sod pan used is exposed to the air, which results in the oil being kept very cool. Gasoline is supplied through gravity system, the tank being located in the cowl. The filler cap is conveniently located under the hood.

The motor is designed so that any standard type of starting and lighting equipments with S. A. E. flanges can be mounted. Battery ignition is used. Any make of distributor using the S. A. E. standard distributor mounting can be used. Headlights are adjustable so that light can be thrown on the engine or along the sides of the car.

The clutch is an eight-inch, single disc,



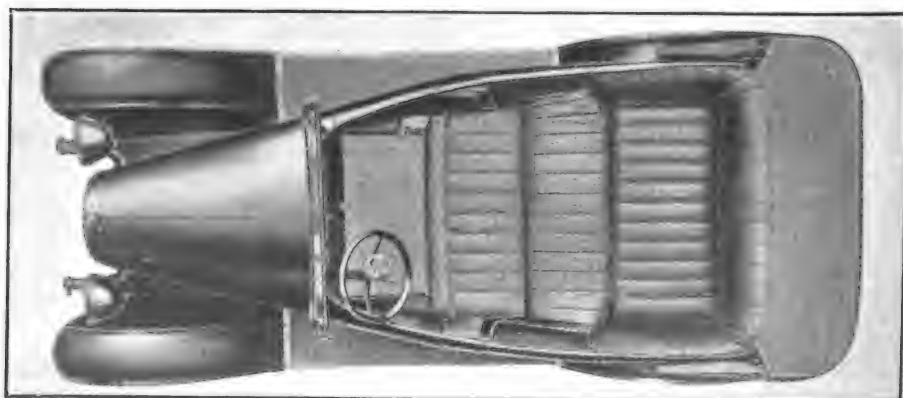
Detail of the Pandolfo Sleeping Car and Method of Transforming the Body Into a Bed Compartment.

car is its compact motor, which is of a light weight, high speed, four-cylinder type, with a bore of $3\frac{1}{4}$ inches and stroke of five inches. Both intake and exhaust valves are $1\frac{1}{4}$ inches in diameter in the clear. The overall length is only 27 inches and the weight is less than 400 pounds.

The intake valves are in the head and the exhaust valves are on the side. The cylinder head is removable, which leaves both sets of valves accessible. The carburetor is bolted directly to the head and the intake manifold is cast integral with the head. The flow of gas from the carburetor is evenly distributed to all cylinders through the design of intake manifold. Hot air is supplied to the carburetor from a passage cast integral with cylinders.

The crankshaft is fully counterbalanced by a patented device and is hung

tor, being $2\frac{1}{4}$ inches in diameter. Due to the use of ball bearings and the spe-

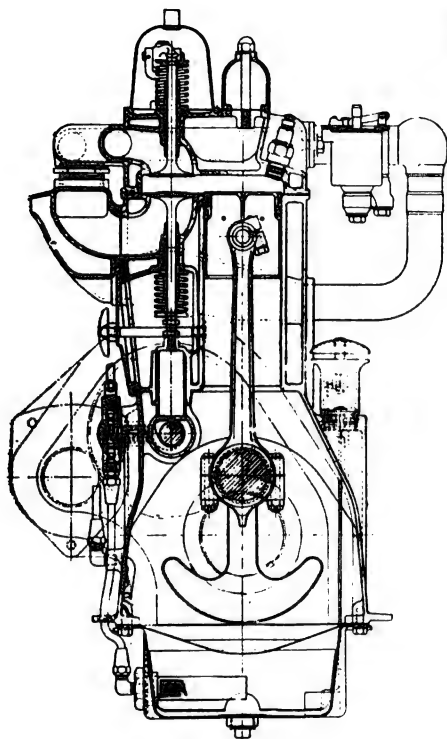


Back of Front Seat Swung Down and Foot Rest in Place, Forming Large and Comfortable Bed with Ample Room for Two Persons.

dry plate, and the transmission is a standard, three-speed type, fitted with bearings and provided with a lock to hold the gears in reverse, making the car thief proof.

Another feature of the Pan is the design of brakes. The emergency brake is mounted on the rear of the transmission case and the service brake is on the rear axle, both brakes being internal and enclosed, making them practically dust proof. The emergency brake is 10 inches in diameter and 2½ inches wide. The service brake is 12 inches in diameter and 2¾ inches wide. The rear axle is of the three-quarter floating type and both front and rear axles are equipped with Timken bearings. The rear axle ratio used is five to one.

Spring suspension is semi-elliptic in

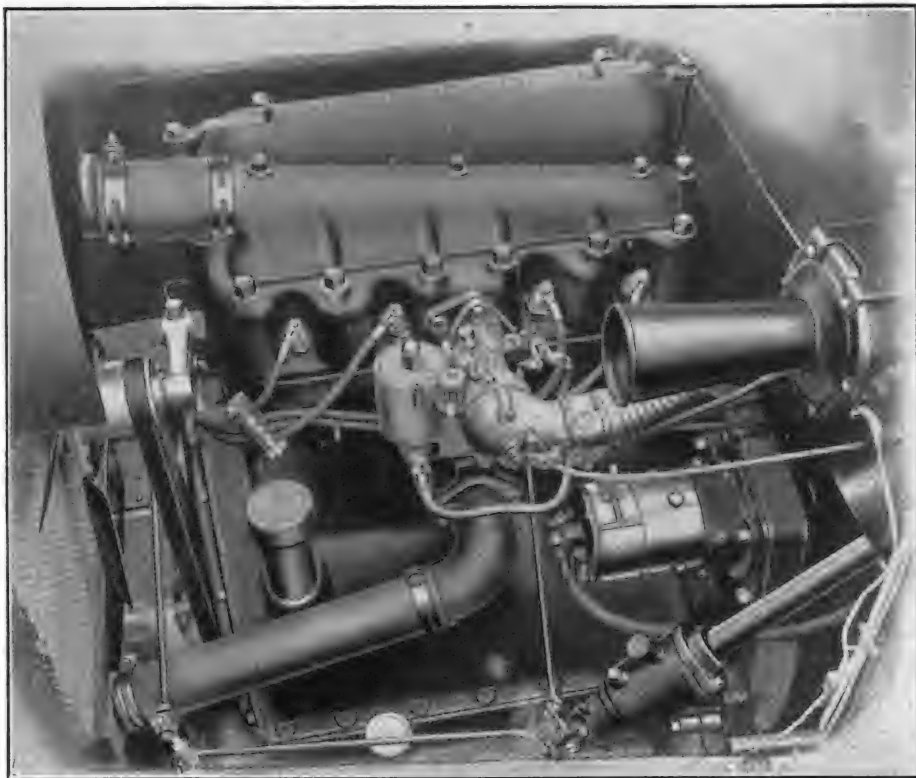


Detailed Drawing of End Section Showing Method of Crankshaft Balance and Carburetor Bolted Direct to Cylinder Head.

front and semi-elliptic, employing Hotchkiss drive in rear. The front spring is 36 inches long and the rear 50 inches long. Spring center distance at the rear is 42 inches.

With the exception of the front axle spindle bolts and steering gear there are no grease or oil cups on the car, self-lubricating bushings being used throughout.

While the wheelbase of the car is 108 inches, owing to the compact motor and consequently the need of less engine space, the body has as much room as would be available on the ordinary car of 115-inch wheelbase. A rather unique yet practical feature of this design is the Pandolfo sleeping car body, which is so arranged that by turning two lock bolts the back of the front seat can be dropped down on a level with the rear seat

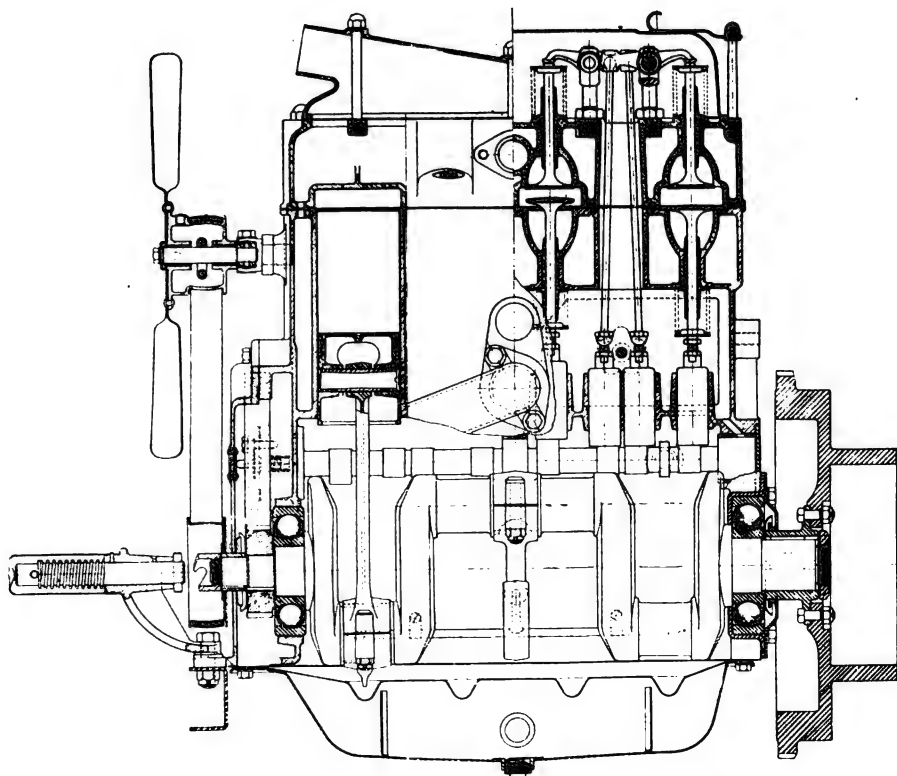


Pan-Powered Motor 45-50 Horsepower, Showing Small Size and Concentration of Equipment Where Readily Accessible.

cushion, forming a comfortable bed. The car is also equipped with the Pandolfo combination compartment tank at the rear, allowing one to carry a reserve supply of gasoline, oil and water. There is also a compartment for tools and a compartment for provisions, cold drinks and ice.

The frame is of deep channel construction, being 6½ inches deep. A spare tire carrier of light, but rigid construction, equipped with a special tire lock, is also part of the equipment. The tires are 33x4.

Fully equipped the car weighs approximately 2300 pounds.



Sectional Side View Showing Large Main Ball Bearings; Large Water Jackets Around Valve Chambers; Camshaft and Valve Assembly Mechanism.

Boy Scouts Take Motor "Hike"

Party of 50 Cover 2100 Miles In Big
Goodyear Transport Trucks—Slept Enroute

A MOTOR "hike" of 2100 miles, the first of its kind ever attempted in America, has just been completed by a party of 50 Akron, O., Boy Scouts with their officers, through the generosity of P. W. Litchfield, president of the Akron Council of Boy Scouts of America and vice president of the Goodyear Tire and Rubber Co. of that city.

For several years it has been his custom to provide a summer outing for the scouts, usually in a camp, but this year the jaunt took the form of an extended tour through the East, following the Lincoln Highway to New York, then the old Boston Post Road from New York to Boston through New Haven, Hartford, Springfield and Worcester, returning through Providence, New London, New

the baggage and camp equipment, and a fifth, equipped with a military field kitchen, served as a commissary truck.

The passenger carrying trucks were fitted with side seats, which at night could be folded, permitting the entire floor space of the truck to be used as a sleeping compartment. Mattresses were placed on the floor and comfortable sleeping quarters arranged. An upper row of bunks was provided by stretching a canvas sheet half way between the floor and the top of the truck. The three trucks furnished sleeping accommodations for the entire party of scouts and officers.

In addition to furnishing a tour for the scouts the expedition had for its objects the stimulation of interest in boy scout



The Troupe Entering the White House at Washington, Where They Were Greeted by President Wilson.

work made riding very comfortable. The entire tour was remarkably free from mechanical or tire trouble, no tires having been changed on the three passenger carrying trucks, and only three instances of tire trouble on the others, all of a minor nature.

Official notice was extended to the expedition at Boston by the mayor of the city and the governor of the state. After a tour of the city, including a visit to the



At the end of the 2100-Mile Tour the Boys Showed No Signs of Being Tired or Weary, but Arrived Back in Akron in High Spirits and Full of Enthusiasm.

York, Philadelphia, Baltimore, Washington, Gettysburg and Pittsburgh. Two full weeks were covered in making the trip.

Five of the big trucks of the Goodyear Tire and Rubber Co.'s Akron-Boston express line, which operate constantly between Akron and Boston, carrying rubber products, were used to transport the party. Three of these, with special seating and bunking arrangements, hauled the scouts, while a fourth took care of

work and the demonstration to the government of the possibilities of transporting troops from the interior of the country to the seacoast by motor truck in times of emergency. The trucks were operated continuously, day and night, stops being made only for gas and oil and for meals. Just before meal time the commissary truck, which was capable of greater speed than the others, moved ahead of the caravan, selected an eating place and had the meal ready for the party by the time the other trucks arrived.

The party slept on the trucks while they rolled at night, apparently as comfortably as is possible in a Pullman. New York, 513 miles distant, was reached in 47 hours, and Boston, 785 miles from Akron, in 61 hours, the rate of speed for the total elapsed time being 13 miles an hour—twice the average speed that our army trucks are making in overland deliveries.

All of the trucks were equipped with big cord pneumatic tires, 38x7 front and 44x10 rear, and the cushioning they pro-

vided made riding very comfortable. The entire tour was remarkably free from mechanical or tire trouble, no tires having been changed on the three passenger carrying trucks, and only three instances of tire trouble on the others, all of a minor nature.

On the return trip stops were made in New York, Philadelphia and Washington for sightseeing. The climax of the trip came at Washington, where the entire party was officially received by President Wilson at the White House. The President showed a keen interest in the tour of the scouts, as it was related to him by Col. Colin Livingston, Washington scout official, and congratulated them upon their fine appearance and the wonderful opportunity they were having of seeing the famous historical spots of the East. "I wish I could take a day off and go with you," were his parting words, after he had shaken hands with each one of the party.

Returning from Washington, the Gettysburg battlefield was visited and a big U. S. marine parade participated in at Pittsburgh.



The Military Field Kitchen Stopped by the Roadside to Prepare Steaming Hot Meals.

BOILERMAKERS WANTED BY U. S. NAVY.

The U. S. Navy Recruiting Service has issued a call for the enlistments of boilermakers for the regular navy (for the duration of the war). Men of this trade are especially needed. The present war pay for this grade is \$77.50 a month and in addition to the salary the men are privileged to make special monthly allotments to dependents, which is paid by the government, and also can subscribe to the insurance which the Navy offers at a very low rate. The age limits are 21 to 35 years.

To enlist apply at any recruiting station or address Lieutenant-Commander Newton Mansfield, Recruiting Inspector, Eastern Division, 225-227 West 42nd St., New York City.

The Clark Tonneau Windshield eliminates the strong wind pressure and the clouds of dust which often envelop those on the rear seat. The windshield is easily attached without disturbing the upholstery on the car. When it is not in use it is turned back out of the way, but can be brought into service by a slight pull.

Manufactured by A. N. Clark & Son, Plainville, Conn. Write for prices and literature.



Showing the Bunking Arrangement in the Big Trucks, Which Permitted the Train to Continue Traveling While the Scouts Slumbered.

DESIGN AND CONSTRUCTION OF U. S. TWO-STAGE AIR COMPRESSOR.

The United States Air Compressor Co. of Cleveland, O., manufacture a complete line of air compressors in both the two-stage and single-stage types, comprising 20 different units. These units vary in capacity from $1\frac{1}{2}$ cubic feet to 21 cubic feet per minute, and are capable of maintaining pressure up to 500 pounds.

The manufacturers claim that unusual efficiency is obtained by utilizing the two-stage principle. In support of this claim the experience of millions of automobile drivers is cited as evidence that the two-stage principle is superior to that of the single stage.

It is well known that whereas single cylinder hand pumps were in general use a few years ago, it is a very rare sight to see one now. This remarkable evolution is claimed to have been brought about by the superior construction of the two-cylinder (two-stage) hand pumps. It has been pointed out by the manufacturers, however, that in the design of U. S. two-stage air compressors, one weakness of the two-stage hand pump, namely, the stuffing box, has been completely eliminated; furthermore, their machine is improved in 14 important details.

The operation of their United States two-stage air compressor is explained as follows:

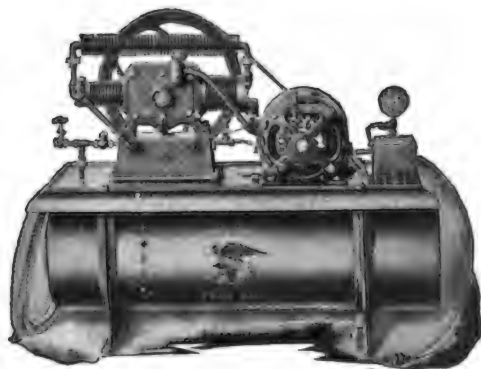
One of the principal efforts of machinery designers is in the direction of eliminating resistance. The greater the resistance in any machine the lower the efficiency.

An air compressor continually operates against resistance and the unprecedented success of the United States two-stage compressor has been due to the fact that resistance has been reduced to the very minimum with a relative increase in general efficiency.

An air compressor must overcome the

tank resistance at each impulse or its efforts are of no avail. A single-cylinder (single stage) compressor takes air in at atmospheric pressure and forces it direct into the tank. The greater the diameter of the piston the greater the resistance to be overcome and the greater the possibility for piston leakage.

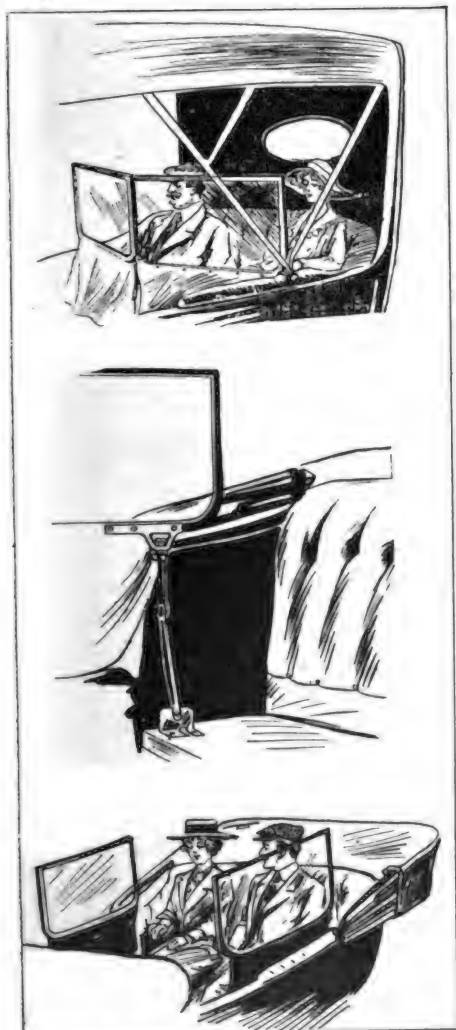
Now contrast this with the operation of the United States two-stage compressor: As the piston in low pressure cylinder moves to the left it takes air in at atmospheric pressure. On its return this air is forced through inter cooler into high pressure cylinder, being raised to 40 pounds pressure, the first stage. This



U. S. De Luxe Two-Stage Air Compressor.

piston now "steps up" the air again to a very high pressure twice; a small diameter piston instead of a large one works against the tank pressure; two power impulses instead of one are attained at each revolution; the crank is balanced between two bodies of air, which gives a cushioning effect, reducing the noise and vibration to a minimum.

A catalogue describing the complete line of United States air compressors will be sent to any one who writes the United States Air Compressor Co., Carnegie Ave., Cleveland, O.



Clark Tonneau Windshield.

PLATE XXV

GENERAL UTILITY GARAGE and SERVICE STATION

With Appointments For Small Dealer and Repair
Business or For Housing Fleet of Delivery Cars

(Designed by the Architectural Department of the Automobile Journal Pub. Co.)

THE design in the accompanying plate meets the requirements for a small structure for a dealer in automobiles in a small city or town or for a garage to house and maintain a small fleet of delivery trucks for store service or other purposes. Its appointments are also suitable for public garage purposes in small cities or at summer places, affording facilities as it does for housing about 20 machines.

With a floor plan of this design the owner can make almost any rearrangement of the interior to suit his purposes. If it was to be used extensively as a repair shop the rear end could be readily changed into one large work room with space and pits for several cars by combining the wash stand space and tool room as one, or should it be desired for use as an automobile station and sales room the office could be extended back along the main wall, giving sufficient space for showing several models, as well as wall and counter space for an accessory and supply line. Under present conditions most dealers are endeavoring to handle as many different ends of the motor car business as possible as a means of cutting down overhead, as well as making up for those branches of the business that have become slack through the lack of products to sell. If, however, it was intended to confine the use of the building to that of housing cars alone, as this business might prove most profitable under some circumstances or in certain locations, even a smaller office than that shown would suffice and both the tool room and wash stand could be dispensed with to gain additional space for five or six more cars.

Built of brick with cement block trimmings and wooden roof, it makes a permanent and rugged structure, suitable for any climate. It is 35x96 feet, providing 3360 square feet of floor space, of which 660 square feet is occupied by the wash stand, tool room, coal bin, boiler room and office, leaving 2700 square feet for car space.

A solid foundation is very essential for this type of building and the foundation walls should be of concrete 20 inches thick and extending six feet below grade. They should also extend 18 inches above grade, forming an underpinning for

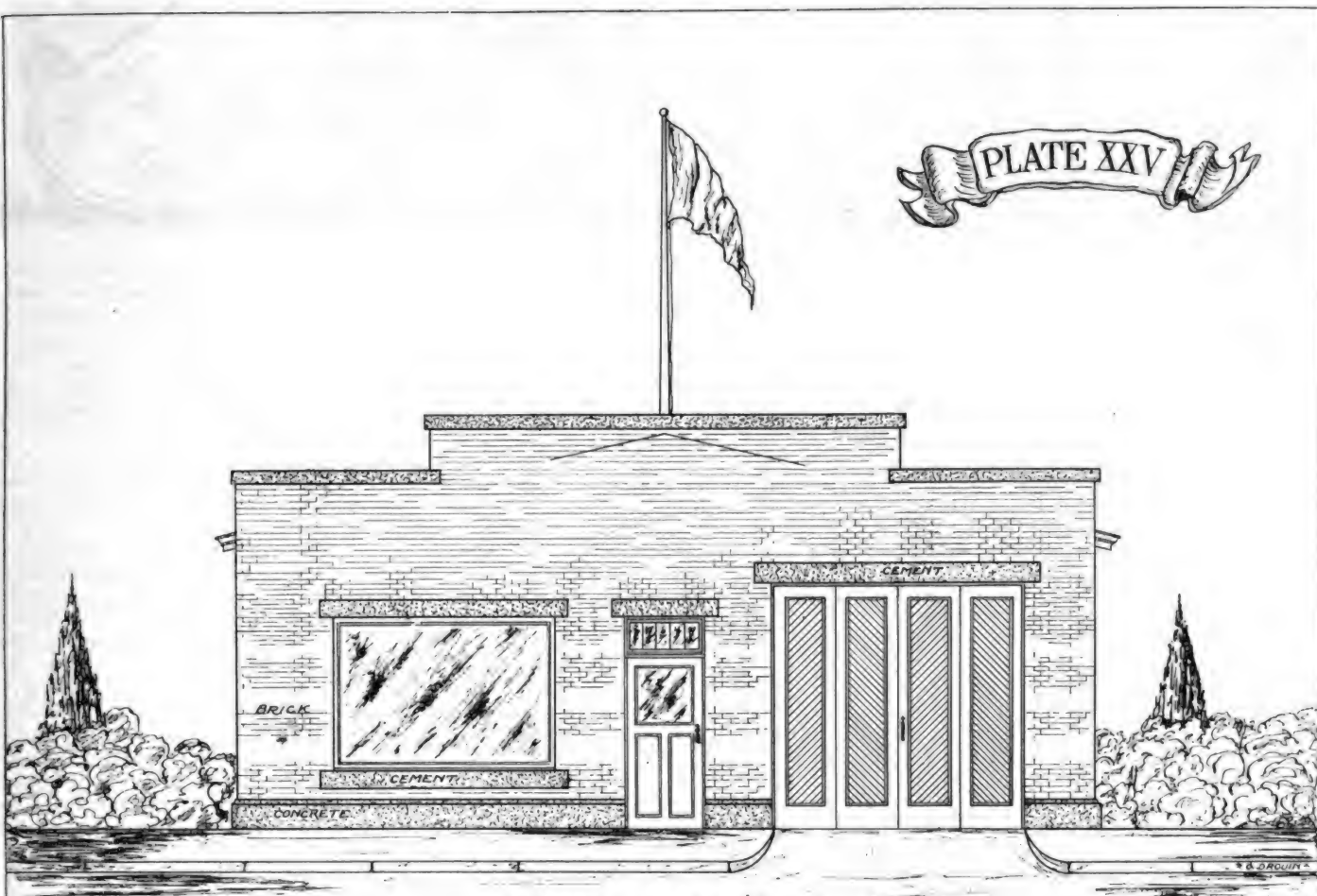
the main walls, which are of brick, 12 inches thick. As shown in the elevation the front wall is carried above the roof line, improving the exterior appearance of the building.

The roof is supported by trusses built up of 8x12-inch hard pine timbers, which rest on plates of 5/8-inch iron, 12x18 inches, placed in the walls eight inches and laid 12 inches on centers. One and two-inch wrought iron rods are used in the construction of the truss, the larger sized rod being used at the center and the two smaller ones on either side of it at a point half way to the walls, giving the necessary rigidity and avoiding the use of posts to support the roof. The roofing unit is made up of 2x7 inch rafters, with 7/8-inch matched boards and three-ply roofing paper.

All the door and window lintels and window sills are made of reinforced cement. Owing to the inadvisability of having the doors swing out on a building of this design, the accordion or folding type of door, which swings in is the most appropriate, as they not only fold completely against the wall, require little space and very small clearance, but permit of the use of one of the center doors as a service entrance. They are weather tight and with the use of three butts on each door warping is prevented, and it is also guarded against by the use of strong steel foot and chain bolts. The Stanley garage door sets No. 1778 and 1779 are especially designed for these doors and when properly installed with this outfit should give no further trouble during the life of the building. The doors are easy to operate, as with the No. 1778 set each door swings on frictionless ball bearings fitted in weather tight washers between the grinding surfaces of the hinges and butts.

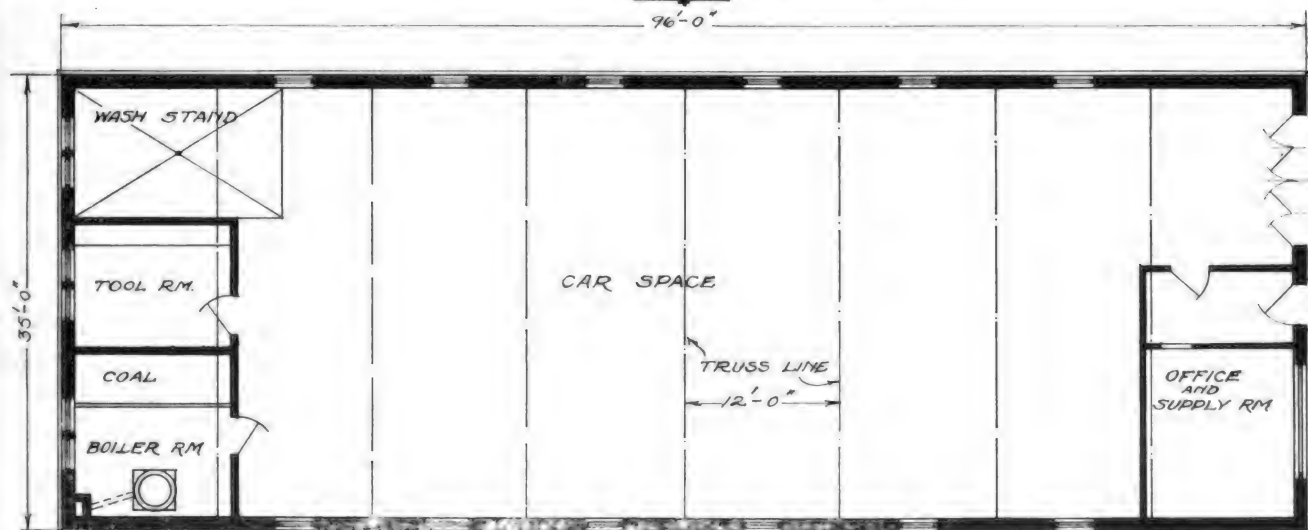
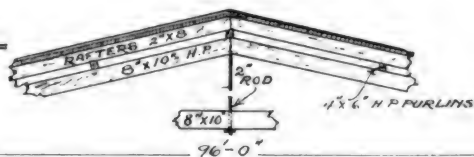
A small, but substantial heating apparatus is necessary in a garage with these dimensions and the radiators or pipes should be hung along the walls directly in front of and at the same height with the radiators of the cars when they are in their proper positions.

The cost of a structure of this type would vary considerably according to the location of the site, but in a city where building supplies are accessible the total outlay should not exceed \$8000, including labor and finishings.

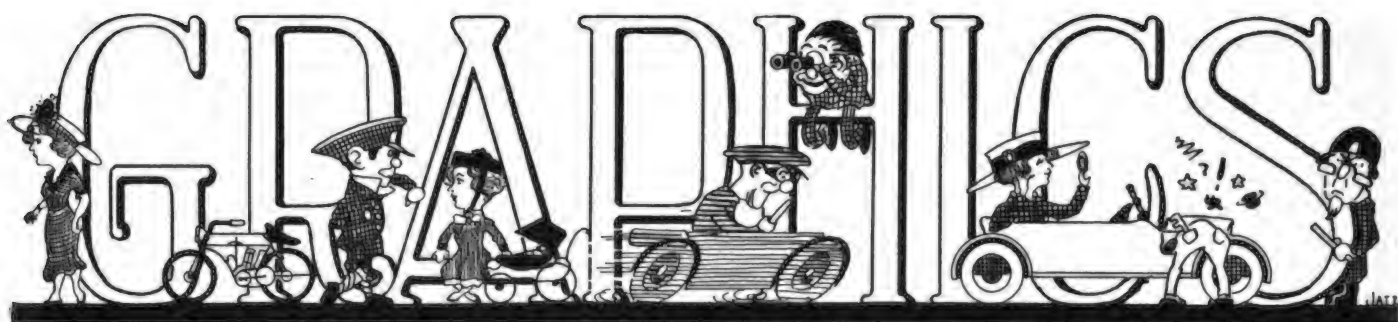


FRONT ELEVATION
SCALE

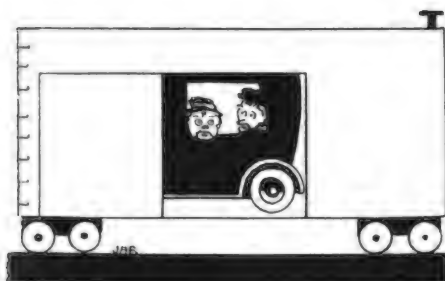
SECTION OF
ROOF



PLAN
SCALE



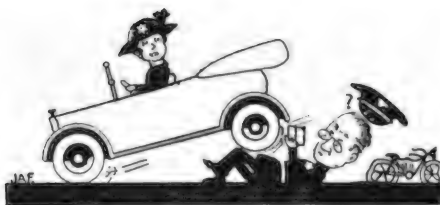
It is truly a time of democracy and this spirit is pervading the entire country to an extent that even he "who toils not nor spins" is enjoying the luxuries of the table and travel that was once thought the exclusive prerogative of the bloated bondholder and trust magnate. Weary Willie, the only true exponent of the simple life, has at last come into his own and on his frequent peripatations no longer suffers the torments of car wheels clicking over the rails close to his ears, or the odious noise of ungreased springs and axles. At least these extraordinary changes have come about in the life of the hobo if we are to believe the New York Sun and, of course, in this case seeing is believing, as their slogan is "If you see it in the Sun it is so." Here is the story: "A Packard brougham was shipped to Earle C. Anthony, the Los Angeles dealer, in a closed freight car containing other



merchandise, including three hoboes. And it may be assumed that when three 'boes find themselves traveling across country with a luxurious passenger car they are not going to spend their sleeping hours on a shipment of horse shoes or drain tile. In this case they didn't. When the car was unveiled at Los Angeles it was very evident that the sartorial derelicts had used it for a traveling hotel. And as is customary with certain hotel guests, they annexed all movable articles, such as interior fittings, for later use. But they left the usual note. It read:

"Packard Motor Car Co.: We have just had a delightful demonstration ride in your lovely Packard limousine, and we are delighted with it. While it is true we did not see much scenery, the sides of the box car preventing, the vehicle rode very smoothly, with an unsurpassed degree of comfort, and the next automobile we buy will surely be a Packard. There is just one request we would like to make, and that is, that in the future your company build your limousines

about six feet longer, as we found considerable difficulty in three of us sleeping comfortable in this bed at one time. "A PACKARD TOURIST."



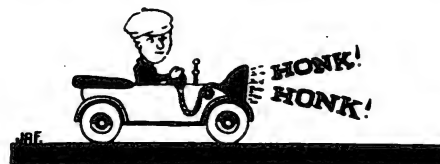
A doctor of the female sex in a Connecticut town in order to get a party of her friends to a departing ferry boat on time virtually perpetrated a barrage on the automobile laws of the place, including in its effect both the legislative as well as executive departments, as she not only shattered the speed regulations, but rendered the traffic cop "hors de combat" by touring over his person in a north to south direction without stopping to see if the non-skid tread on her tires had left the manufacturer's trade mark tattooed in mud along the cheek of the human obstacle.

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James W. Synan of the Massachusetts Highway Commission is of the opinion that the too liberal use of the horn is responsible for as many accidents as the too frequent neglect to use it.

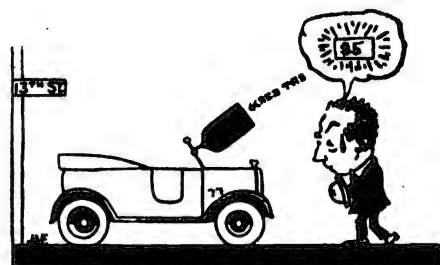
"Fewer persons would be knocked down in the roadway if the man at the steering wheel were to drive slowly and carefully, rather than to continue at ordinary speed and depend for safety upon the honking of a horn," said Mr. Synan. "In virtually all of the cases coming before the commission the contention is put forth that the motorist made good use of his horn. Nevertheless accidents occur every day.

"In many cases the honking of a horn not only warns a person, but startles him. Take the case of three or four children at play in a street. Along comes an auto at an ordinary clip. The youngsters are intent at their play. Undoubtedly they are moving about but not toward the center of the street. When an auto is within 10, 20 or 30 feet they



hear the honk of a horn. At the same moment one of their mothers, or several hears it. Cries come to the children to 'look out' or 'come here.' If a child is on the opposite side of the street he instinctively crosses to his mother; else the mother darts out to protect him. Then the accident occurs.

"These cases among children, and, I might add, among aged and infirm people, naturally nervous, could to a large degree be eliminated were the autoist to think less of sounding his horn and more to driving slowly. It is significant that accidents never occur when a machine is being driven at a low rate of speed. They never occur for the reason that the pedestrian has ample time to get out of the machine's path or the autoist to come to a complete stop before striking anyone. Should this precaution be observed by drivers of cars there would be a striking falling off in the number of this kind of accidents."



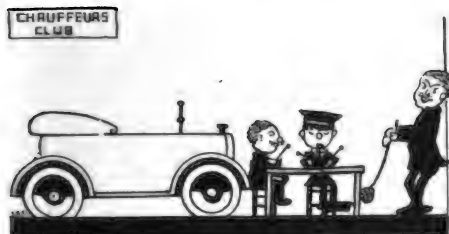
The police of Norwich, Conn., will no longer be made the butts of jokes perpetrated by keen witted motorists and have turned the tables on the latter as it were and again demonstrated the proof of the old adage that "he who laughs last, laughs best." It had been a custom for some time for the policemen to go to a car that had been standing in restricted space over the prescribed period, and stand there until the owner arrived, when he was escorted to the police station. Several wags discovered the possibilities of a very practical joke in this system and upon returning to their machines, if a policeman was in attendance, they returned to their dinner or supper as the case might be and came back five or six hours later to see if the policeman had become tired of his job and given it up. It was not long before the minions of the law discovered this imposition on their vigilance and invented a little tag game in which the motorist is usually "it." Each policeman was supplied with a plentiful supply of large red tags and when he finds an offending

car he literally tags it, as the card reads: "Police Department, City of Norwich, Car No. ———. Driver will report to police headquarters at once."

So that there will be no misunderstanding on the part of the owner or operator the complaint with which he is to be charged is written on the back of the tag.

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From dodging street cars, jay wakers, traffic cops and other numerous obstacles on the New York streets while hitting at anywhere from 20 to 40 miles per hour down to "purling," "turning the heel" and other delicate yet intricate



operations of knitting, is the change of life that has come over the New York chauffeurs. They not only hold regular knitting sessions at their club houses in place of the one-time famous African golf and America's foremost indoor sport commonly known as draw poker, but may frequently be seen in the act of creating a sock while idling at the curb.

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The puritanical code of ethics of the natives at Compo Beach, near Westport, Conn., suffered a rude shock one moonlight night not long ago when they rubbed their eyes in wonder at the sudden change in the forms of a party of bathers disporting in the surf. At first everything appeared conventional, but suddenly the venus like forms that had previously graced the beach in natty bathing suits appeared in skin-tight jerseys and trunks, while the more corpulent and masculine forms were silhouetted against the moonlight with skirts, headgear and flounces that belied their sex. After a brief period of jollification in



the swapped uniforms the party disappeared into an automobile that was parked on the sand and soon drove off in regular street attire. The unsophisticated were later informed that instead of an unusual lark they had only witnessed a motor party taking a moonlight plunge on the surf, which amusement has become a fad along the coast.

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Statistics just compiled, covering traffic upon the Lincoln Highway, near State Center, Ia., indicate that travel at this time is exceptionally heavy. According to the traffic enumerator stationed upon

the highway just to the west of the city, a total of 1707 vehicles passed along the road during 98 hours—an average of more than 17 an hour. The count was taken covering a period of one week, during the first five days of which the weather was rainy and the road was muddy and rough, tending to discourage travel.

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Officials of the Mexican government are negotiating with Henry Ford for the construction of a tractor building plant in Mexico. It is proposed to operate the factory with Mexicans, who will at first be given a course of mechanical instruction at the Fordson plant at Dearborn, Mich. Pastor Rouaix, secretary of agriculture of Mexico, who has recently been staying in New York City, made a two months tour of the farming sections of this country and made a study of methods and farm machinery. He paid a visit to Detroit and while there Henry Ford presented him with a Fordson tractor, painted in the national colors of Mexico.

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In these days when conversation begins with "Isn't it hot?" and leads to a discussion of ways and means to keep cool, it is with envy that we read of a spot in Cleveland that has been transformed into a veritable Iceland. The Rainbow Room, that famous restaurant of Cleveland's newest hotel, the Winton, has installed a large platform of solid ice on which the country's most famous skaters appear in an ice carnival, both noon and evening.

Attentive to the comfort of its patrons, the management has installed an elaborate system whereby all air entering the Rainbow Room is washed over ice and by this means an even temperature of 70 degrees is maintained.

The pleasure of dining in such an atmosphere when heat waves outside are causing prostration is further added to by the excellent music of Paul Biese and his famous Chicago Novelty Orchestra.

The ice carnival program is led by Norval Baptie, the world's champion ice skater, and his charming partner, Gladys Lamb. Among the other artists should be mentioned Romaine, a niece of Billie Burke; Loos Brothers, singers of the latest popular songs; St. Pierre, a grotesque, but clever comedian, whose antics on the ice create much laughter; Smith and Russo, two charming young girl skaters.

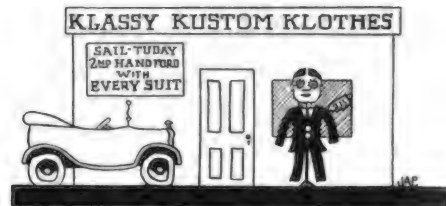
Motorists visiting Cleveland will find the Hotel Winton a most delightful "home" and the Rainbow Room a restaurant where one may dine pleasantly while enjoying the ice carnival.

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Linking the Ford car up with a sales proposition has always proved very alluring and profitable, but occasionally these attempts at jumping into a fortune have brought the reverse effect. A clothing dealer on Long Island readily reasoned that if he could only give a flivver with each suit his future would be assured, but as this seemed impossible

after a few dashes with the pencil he hit upon the next best thing and offered a chance to own one with each purchase. Here is where a brilliant business genius miscalculated, as he landed in court with an opportunity to deny the evidence charging him with violating the law, which evidence read as follows:

"Wearers of Klassy Kustom Klothes—Opportunity Invites You. If you are one of those Particular Men who realize that success in approaching the Customer often hinges on the First Impression created by the Salesman you shall not hesitate in Placing your Order with this First Class House. A Klassy serge, pin check or Palm Beach suit with belted-in



back, diagonal pockets and turned up cuffs with pearl (genuine) buttons. All at the sacrifice price of \$1 a week for 35 weeks. With each order there is issued a numbered card. Whenever the number on your card corresponds with the last four numbers of the Monday evening reports of the New York Clearing House of the Banking Exchange you get a "FORD CAR FREE."

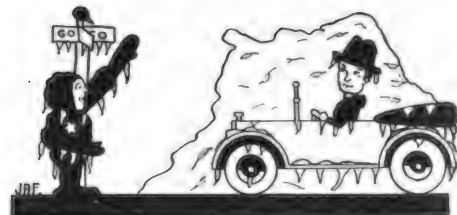
"Place your order now and by keeping the wheels of industry turning

"HELP WIN THE WAR."

Reading this circular, which was well circulated among the trade, it does not seem that the chance on a flivver was necessary as an inducement to wear Klassy Kustom Klothes, as it certainly speaks for itself, and any motorist should be proud to wear a suit answering the description given.

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Iceland, the "land of the midnight sun," is generally thought of as a country where most of the facilities of civilized countries are unknown, but this is evidently a mistaken impression, as the



natives are taking to the motor car at a rapid rate. Only \$1000 worth of automobiles and automobile accessories went to Iceland from this country in 1913, which would mean at the most, two cars and a few tires, while last year the imports were valued at over \$10,000. There is no reason why motoring should not become the most popular sport in that country, taking into consideration the geographical facts connected with it, the motorists having the advantage of days six months long in which to tour in and nights of the same length of time in which to joy ride.

Inventorying the Motor Woman's Wardrobe

THIS is the season of year when the motor woman takes an inventory of the odds and ends of her last summer's wardrobe, which she has kept carefully put away in a special closet, her secret base for economy and smartness. There are always quite sure to be several hats of assorted shapes and sizes. She is very apt to have one or two of these hats reblocked, and, if she is wise, she will select one for recoloring. There is an excellent process by which she may do this recoloring and I am going to dis-

Odds and Ends of Last Summer's Millinery

By MRS. A. SHERMAN HITCHCOCK.

on any hat of her own trimming. Kid fruits, those charming little apples, piums and other nameless fruits that appear in bright colors on the smartest of millinery, are sometimes quite short lived and after they have faded and become shabby they may be painted with the opaque water color known as "tempera" paint, which comes in tubes in the vivid shades that are so smart this season. After the tiny fruit and leaves have

to dress women; man was clothed in whatever was left. But today, man, the warrior of the world, must first of all be garmented in such a manner as to resist cold and wet, and woman must be clothed in what he does not need.

I am bringing to your attention the new Escadrille costume, which made the most wonderfully popular sensation at the Fashion Show recently. It is the creation of Alexander M. Grean, America's foremost designer, who has given to motor women many garments of great



Every one of the noted designers are endeavoring to create the ideal costume for women to wear both for motoring and aviation and it is due to the inspiration and ingenuity of the wonderful Grean to originate the model that has been taken up with avidity and named the "Escadrille" costume. It is made of beaver satin in dust color and is so constructed that it may be worn in three different ways. (Courtesy Alexander M. Grean, New York City.)

been painted and dried a porcelain effect may be obtained by giving them a coat of shellac. This gives the fruit a charming glaze and keeps the paint from peeling off or cracking and also makes them high in fashion's favor.

The inevitable reaction against false economy in the buying of clothes has been followed by an equally sensible reaction against the use of unnecessarily and depressingly somber color schemes. While khaki color and olive drab and the various military shades of tan are often used as the predominating tones, brilliant touches are introduced in many delightful ways. While there are so many charmingly colored fabrics and garments for motoring wear to be had, dull monotony in motor dress really has no excuse for being. And even when one dark tone is used it is often relieved by gayer brightening colors. Not within the memory of any one who reads this article, if ever at any time before, have motor garments or materials for making them been so interesting as they are today. Of course all fashions are based on the exigencies of war; it has always been that the matter of importance was



close the secret. The hat to be colored is spread out on a flat surface and painted with sealing wax dissolved in alcohol. If the hat is dark it will, of course, take only the darker shades of this dye, such as purple, dark blue and green. The dye is very easy to make; one has merely to dissolve enough ordinary sealing wax of the desired color in alcohol to make a solution thick enough to cover evenly the natural color of the hat. This is painted on in even strokes with a rather stiff brush, and besides coloring the hat, this treatment gives it a renewed stiffness and renders it practically water proof. The advantage of this dye over the commercially prepared ones is that it is possible to produce softer and more subtle shades, which are unusually becoming and quite exclusive.

Since fruit trimming on motor hats is so greatly favored this season, the motor woman can use it to decided advantage

excellence designed expressly for her use. The Escadrille costume is built of beaver satin, which possesses unusual wearing qualities, as well as great beauty and a fine adaptability to manipulation. It is in dust color and is composed of a tight fitting hood helmet, a union suit of very new and interesting construction requiring scarcely any fastening devices—the knickers and waist part being joined and held together by overlapping bands and belt—and a pointed cape which has elastic at the top and may be used as a skirt when desired. Another garment, which will be greatly appreciated by the motorist, is called most appropriately a "War Habit," and is also one of Mr. Grean's creations. It has been especially created to aid the government in conserving the wool for our boys "over there." It is a sleeveless, reversible garment to be worn over any kind of blouse or guimpe. It is made from one piece of double width material, 1½ long. It has no seams, no hooks, no

buttons and takes less than a minute to put on and take off. It can be worn inside out, the front in the back or vice versa, thus making four different exclusive styles in one garment.

The beaver satin of which the Escadrille costume is made, is one of the best materials for motoring garments of any kind. They possess an exquisite luster, are soft and pliable in texture and wear



The all-over sweater has won a well deserved place in the affections of the woman motorist and here is one of the very handsomest of the season. It is hand made of the Minerva yarn, which combines an excellence of quality and beauty not easily equalled. The charming little motoring hat is also hand made and both hat and the crocheted flowers that adorn it are made of Minerva yarn.

most satisfactorily. There is no material which will be higher in fashion's favor this coming fall than satin and all kinds of garments will be fashioned from it. The motor woman needs materials which will endure hard wear when necessity demands and still retain their attractiveness. This is just the service which beaver satin will give. It has been manufactured with a keen appreciation of real every day needs. On account of the wool conservation motor coats will be made of satin for fall and winter, warmly interlined and heavily trimmed with furs, and in some cases lined with fur also.

Now that we are bound to get the cool evenings—and are approaching the fall season so rapidly, the sweater of wool is in very great demand. It is a garment which is really an absolute necessity for the motor woman, so that she need not feel in having one that she is in any way unpatriotic. Uncle Sam does not demand that we deny ourselves the necessities, only that we shall not be extrava-

gant with them. The motor woman should be most particular in selecting the best quality of yarn with which to knit her sweater, as only the best gives satisfaction later. There are some lovely models illustrated, made of the Minerva yarns. The directions for these garments are easily obtained and there are the most exquisite shades in the Minerva yarns. For the warm, heavy type of sweater the four-fold Germantown is used; for a more dressy affair the Vicune is the better choice, on account of its beauty and sheen. Shetland and Zephyr floss are lighter in weight and in consequence fit closer when made up and carry an extreme amount of fashion value. Pink, Nile, chamois, spray, peacock, lavender, American Beauty, coral, turquoise and tan are among the most lovely of the Minerva yarns, while there is an unusually varied range among the standard and best liked shades. It is a yarn to be very highly recommended.

Something which every motor woman will be delighted to know of and make immediate use of is the very new tubular woven ribbon for girdles of motor and sports apparel and one-piece frocks. Many a motorist has felt discouraged by a stringy belt or girdle, which really spoiled the appearance of the garment. This new tubularly woven ribbon is one of the well known "Regatta" products, and imitates a knitted fabric. It is about $4\frac{1}{2}$ inches deep and it is possible to purchase just the yardage desired—whether one wishes to wear it doubled about the waist or otherwise, at a price not at all exorbitant, and tassels or fringe may be added to the ends, or fancy ends made out of the fabric itself. The tubular ribbon comes in 11 shades, all new and charming. It is so woven that it will not stretch, as is the case with the regulation sports girdle. Another very desirable feature is that it will not crush down, but will always keep its regula-



No smarter model could be imagined for the motor woman than this hand knitted one of Minerva yarn. Its originality, combined with its attractiveness, serviceability and quality of yarn, makes it a leader among high class garments of this character.

tion depth. For motor frocks, separate skirts, sweaters, sports coats and the new sleeveless coats these tubularly woven girdles cannot be recommended too highly.

The Pettibocker has established itself as one of the most practical and essential garments in the entire wardrobe of the motorist. For the woman who drives it is a particular valuable acquisition,



"The Sunshine of Her Smile" may be due to anticipation of a motor tour, or it may be that she is so pleased with her smart and becoming hand-made motor hat and sweater, which, worn with a patent leather belt, is certainly the acme of perfection along these lines. Both the sweater and hat are made of the beautiful Minerva yarns.

doing away as it does with all petticoats, which are really such a nuisance about a woman's feet when she is in the driver's seat. The Vanity Fair Pettibockers is a petticoat in frilly appearance and a knickerbocker in comfortable reality.

Veilings are becoming a mania with motor women who do touring and the colors are many and beautiful. Some of the most popular tones are vivid, embracing all the Bulgarian shades, but all colors cannot be worn by all motorists. The new Cascade blue, the green tones, the reds, which include the very new Marriane, Satanas and Cardinal, the glowing tangerine and pinkish yellows are in themselves slightly spectacular, but they are all used by smart motorists, while the softer tones, the Ether and Chinois, blues, the Roseau and Charreux greens, the Zoulon brown, the Jacinthe purple, the melting yellow and rose tints and the beige and gray tones are all lovely and always in good taste and are favorites with the conservative motor woman.

The Essex---A New Car in a New Class

Built in Hudson Factory and Sold by Hudson Dealers

Last fall, when it was announced by the newly organized Essex motors that it would have a new car for the market this summer, there was considerable speculation in the trade as to what the new model would be and additional interest was manifested in the announcement because the directors of the new company are also officers of the Hudson Motor Car Co.

None of the details of the new design that would be marketed as the Essex were made known to the public or trade until recently, when Hudson distributors were called to Detroit to see the finished product. The Hudson and Essex organizations, however, are to be kept separate, but the fact that the Essex is to be built in the Hudson factory and sold by Hudson distributors and dealers gave the new car a substantial standing at the outset.

The particular claim made for the Essex aside from its mechanical features is that it enters a market field not now filled by any other car and was designed to meet a definite demand for a car combining the advantages of endurance, safety, comfort and performance, which were features formerly confined exclusively to the higher priced cars.

SPECIFICATIONS OF ESSEX.

BODY—Five-passenger touring car. Price, \$1395.

MOTOR—Four-cylinder, cast in one block, $3\frac{3}{8} \times 5$ inches. Intake valves in head. Exhaust valves in side. Length over all 29 inches. Carburetor bolted to intake manifold, which is contained in cylinder head. Entire combustion chamber machined. Flow of gas from carburetor downward through cylinder head, assuring complete and uniform distribution of gases into each cylinder and



Essex Five-Passenger Touring Car Has Striking Lines.

perfect combustion. Makes easy starting in cold weather and takes care of low grade fuels.

GASOLINE SUPPLY—Vacuum type. Gasoline tank in rear carries 13 gallons and is protected by frame extension. Automatic gauge indicates quantity fuel in tank. Gasoline mileage comparable to that of cheapest, lightest cars.

CRANKSHAFT—Special design, scientifically counter balanced, giving perfect static and running balance at all speeds. Crankshaft distortion is eliminated. Permits higher motor speed.

Three heavy bearings, front $2\frac{1}{16}$ inches diameter by $2\frac{1}{4}$ inches. Center bearings $2\frac{3}{32}$ inches diameter by $2\frac{1}{4}$ inches. Rear bearing, $2\frac{1}{8}$ inches diameter by $2\frac{5}{8}$ inches.

Cams are integral with shaft, extra large diameter run in four nickel babbitt bearings.

TIMING GEARS—Helical of wide face. Tooth cut at angle, which assures quiet operation.

Thermo-syphon water circulation.

LUBRICATION—Constant level, circulating splash. Reservoir made of sheet steel bolted to base of crank case. Air cools oil, insuring thorough lubrication and increased mileage.

Pressure gauge located in cowl apron indicates oil pressure and condition of oil circulating system. Flow of oil through motor is controlled by stroke of

oil pump connected with throttle.

CARBURETOR—Special Essex design, patented, improved type self-adjusting, yet controlled by dash arrangement with strangler for starting.

IGNITION—Starting and lighting. Delco, two separate units.

CLUTCH—Multiple disc contained in oil tight case in center of flywheel. Two sets of discs, both of steel. The driving discs having cork inserts.

Clutch is of proved reliability, gives long service, soft in its engagement, with consequent minimum shock to transmission and rear axle.

TRANSMISSION—Selective type, three speeds forward and reverse. Direct drive third speed. Transmission is bolted direct to rear of motor, making unit power plant. Assures perfect alignment between crankshaft, clutch and transmission. Large size roller bearings used throughout. Security lock is provided to lock gears in neutral position.

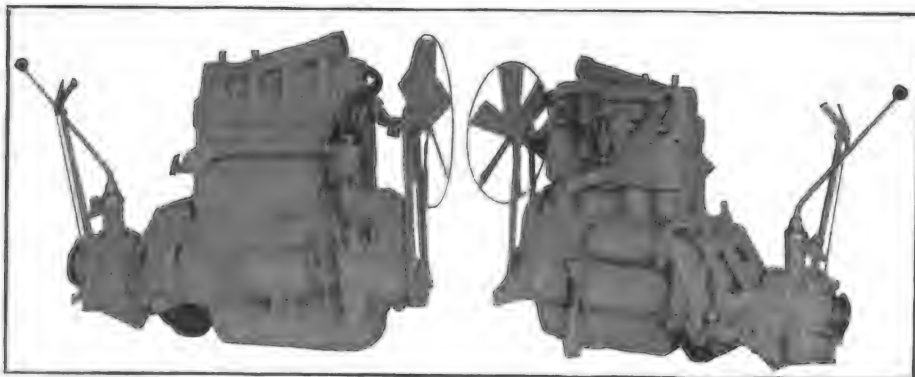
STEERING GEAR—Worm and gear type. Full gear and shaft in one piece. Adjustable to take up wear, both worm and gear.

DRIVING SHAFT—Designed for lightness and strength. Carries two universal joints. All working parts are packed in grease and protected by grease tight steel covers. Ample lubrication assured at all times.

REAR AXLE—Conforms to latest European and American practise. Light, strong and of proved satisfactory performance. Housing is of reinforced pressed steel, much stronger than ordinary tubing and cast type. Driving gears and differential mounted on separate carrier, which is bolted to axle housing and is easily removable without taking axle from under car. Driving gears are of helical type.

BRAKES—Unusual provision for car of its weight. Brake bands 14 inches (35.5 cm.) in diameter and $1\frac{1}{4}$ inches (4.45 cm.) wide.

RADIATOR—Cellular type provided with shutters, controlled from dash. Equipped with motometer. Enables driver to know and control heat of mo-



Showing Both Sides of the Essex Engine, an Extremely Neat and Compact Power Plant.

tor at all times. Further contribution to motor efficiency and fuel economy.

WHEELS—12 spokes, front and rear, made of hickory. Carry tire 32x4 inches. Detachable rims.

SPRINGS—Provide extreme easy riding qualities. Semi-elliptic type both front and rear. Front springs two inches wide by 36 inches long. Rear springs same width, 54 inches long.

Springs assembled with graphite grease between leaves.

Spring eyes equipped with phosphor bushings. Adjustable to take up all side wear, eliminating rattles. Hotchkiss type drive.

FRAME—New design, strengthened at front and rear by tubular cross members. Power plant bolted direct to frame cross member at rear. Frame six inches in depth at points of greatest stress. Assures absolute rigidity. No feeling of frame weaving or insecurity is noticeable even on roughest roads. Prolongs life of car and contributes much to comfort.

WHEELBASE—108½ inches in length.

BODY—Compactness of motor provides ample space to carry commodious body without undue lengthening of chassis. Streamline in design, beveled edges, squared corners of radiator and body.

TOP—Made of rain proof material, equipped with minute adjusting curtains, one man operation.

LIGHTS—Light equipment includes parabolic headlights with dimming attachment. Instrument light and tail light are controlled from dash. Switch is equipped with security lock and keys.

INSTRUMENT BOARD—Carries in addition to ignition and lighting switches, oil pressure gauge, speedometer, carburetor, adjustment for strangling and ventilator control.

OTHER FEATURES ARE—Electric motor driving horn, located under hood operated by push button, center of steering gear. Windshield integrally mounted on body with permanent standards. Lower sash stationary. Upper sash movable outward. Ventilator in top of cowl controlled from dash, provides ventilation in front compartment. Equipment includes tools, special wrenches, oil cans, quick acting jack, hand pump, etc.

STEVENS "WAR TIME ECONOMY" CATALOGUE.

At a time when the motorist and dealer are squaring up their purchases with war time economy—avoiding frills and adhering strictly to accessories that make for increased efficiency and comfort in motoring—a catalogue like that now being issued by the house of Stevens & Co., 375 Broadway, is of unusual merit and timely interest.

More than 200 motor necessities are interestingly described in the new Stevens book, which is replete with bright and informative illustrations. There are 64 pages devoted entirely to Stevens products and among these accessories for Fords are prominently displayed. A copy of this new catalogue will be mailed to any dealer on request.

Picnicing in the Motor Car.

UTENSILS FOR COOKING AND PRESERVING FOOD.

THE influence of the motor car is indeed far reaching. Nowadays nothing seems complete without the presence of the motor car. Now it is the old fashioned picnic which is transformed into a new fashioned one with the aid of the motor. That it is a vast improvement upon the old picnic goes without saying. The distance to be traveled is so much greater, to say nothing about the convenience and comfort in reaching the desired place. Motor picnics this summer are all the rage. They are the pet diversion of her Motor Ladyship. With the coming of summer the motorist longs to spend whole days in the open air, basking in the warmth of the sunshine and breathing in the freshness and sweetness of the blossom scented air.

Early in the spring it is all very well to stop at a hotel or club house for luncheon, but when summer comes the motor woman enjoys spreading the luncheon on a flat rock where she can sit and gaze at the grand old ocean, or perhaps using the soft green grass as her table under the inviting shade of some noble trees. The very latest thing among the motorists is to give a motor picnic and those invited are all packed into the big touring car or, if the picnic is to be a large one, other cars are called into service with perhaps some roadsters and runabouts just "built for two."

The manufacturers of motor hampers, motor camping outfits and utensils to be used for motor picnics, have given their attention to the necessities of the motorist and brought forth all manner of conveniences for those who follow the call of the great outdoors. Motor hamp-

ers can be purchased either in leather or in wicker and come in several shapes and sizes with equal varying prices. They are built very complete with a "place for everything and everything in its place." The Hawkeye Basket Refrigerator is a very unusual article and was built particularly for the motorist. It is so excellently made that with reasonable care it will last many years. Metal name plates may be attached which makes the basket very individual. There are several different styles of the Hawkeye, from the one designed to fasten to the footboard of the car to the "De Luxe" basket of more pretentiousness. They are all made with an ice compartment and a small piece of ice will keep the contents cold for 24 hours. The various other compartments will enable the motorist to carry sandwiches and salads, which will be fresh and appetizing, cool, fresh butter, etc. The remarkably reasonable price of these splendid baskets makes them particularly desirable.

Another outfit that is new and highly desirable for the motorist is the Mirro Aluminum Camp Outfit. It consists of one six-quart pan, frying pan, bowls, cups and saucers, plates, salt and pepper shakers, knives, forks and spoons, all of the lovely and durable Mirro ware with which nearly all discriminating women are familiar. The complete set nests into a small package and fits into a khaki bag. The shakers are equipped with extra unperforated caps to prevent spilling, the frying pan handle is detachable and everything has been carefully thought out to ensure the most satisfactory results for the owner.

The Refrigo Auto Chest is a portable refrigerator that can be carried inside the automobile or upon the running board. The makers guarantee it to be insulated, air tight, sanitary and dust proof. When touring or camping this chest is in-

valuable for keeping the eatables cold and fresh for an indefinite length of time.

Manufactured by the Refrigo Auto Chest Co., Iron River, Mich. Write for prices and literature.



The Refrigo Auto Chest and Same Attached to Running Board.

Personal News of the Industry in Brief

W. J. (Bill) Slater has resigned as pneumatic tire sales manager of the Firestone Tire and Rubber Co. to become general sales manager of the Williams Foundry and Machine Co., Akron, O., the largest makers of tire building and repairing equipment in the world.

Mr. Slater's connection with the Firestone company covers a period of several years, during which time he was successively manager of advertising, sales promotion and pneumatic tire sales.



Chester I. Campbell Will Manage N. A. A. J. Show in Chicago.

Chester I. Campbell, the well known director of the automobile shows at Boston, has been placed in charge of the exhibition that is to be held in Chicago this fall under the auspices of the National Association of Automobile Accessory Jobbers. Decorations for the show will be furnished by the Atlantic Decorating Co. of Boston, of which Mr. Campbell's brother, E. W. Campbell, is manager.

S. Deutsch has been elected vice president and director of the Signal Motor Truck Co., Detroit. He will have charge of production and sales. He was formerly vice president of the Clus Manufacturing Co., Milwaukee, Wis.

E. F. Howells, formerly Philadelphia manager of the Chase Motor Truck Co., has been appointed district sales manager for the Sanford Motor Truck Co., Syracuse, N. Y. His territory will include New York and Pennsylvania.

J. H. Quinlan is now division sales manager of the Selden Truck Sales Co., Rochester, N. Y. He will have charge of Selden sales in Southern Ohio, Indiana, Kentucky and West Virginia. His headquarters will be at Cincinnati, O.

George Effros has been appointed southern district sales manager for the Sanford Motor Truck Co., Syracuse, N.

Y. He will have charge of territory in the states of Tennessee, Mississippi, Arkansas, Alabama and Louisiana.

E. W. Hurd is now director of sales of the Premier Motor Corporation, Indianapolis. He was formerly assistant sales manager.

J. C. Manternach has been elected president and general manager of the American Welding and Manufacturing Co., Warren, O. Mr. Manternach was formerly manager of the rim and tube division of the Standard Parts Co.

Fenn H. Hossick, assistant advertising manager of the Nash Motors Co., Kenosha, Wis., has resigned to take up special work with the Motor Equipment Section of the Ordnance Department.

T. L. Loose is now manager of the Canton spring and axle plant of the Standard Parts Co., Cleveland, O. He was formerly with the Hendee Manufacturing Co., Springfield, Mass. Mr. Loose succeeds J. B. Childe, who has been transferred to the Cleveland offices of the company.



W. J. (Bill) Slater, General Manager Williams Foundry and Machine Co.

W. L. Woodward is now manager of the rim and tube plant of the Standard Parts Co., Cleveland, O.

L. C. Sprague has been appointed special representative in connection with the sale of pneumatic tools to railroads by the Chicago Pneumatic Tool Co., Chicago, Ill.

D. C. MacDonald, formerly manager of the Akron branch of the Mason Tire and Rubber Co., Kent, O., is now with Company H, 315 U. S. Infantry.

W. E. Hutchison, formerly purchasing agent for the United States Ball Bearing Co., has succeeded E. F. Oberlin as manager of purchases of the Denby Motor Truck Co., Detroit, Mich.

Lewis Ford is now associated with the Freeman & Freeman, Little Rock, Ark. The firm has contracted for 1000 Fordson tractors and was given the agency for Arkansas.

Roy B. Simming has resigned from the Gasene company. He was formerly assistant secretary of the Minneapolis Automobile Trade Association.

J. H. Harrison has been appointed sales promotion manager of the Parrett Tractor Co., Chicago, Ill. He was formerly advertising manager of the Chalmers company, also associated with the National Cash Register Co., and the Burroughs Adding Machine Co. Mr. Harrison will have charge of the advertising and sales promotion.

Leslie F. Smith has resigned as general manager of the Willys-Overland branch at Newark, N. J. During his managership he was connected with the Automotive Trade Association. He is succeeded by C. B. Derby, who has been assistant sales manager of the Willys-Overland New York branch for several years.

William H. Eged has been appointed sales director for the Fulton Truck Co. of Philadelphia, Pa. He was formerly general sales manager for the Mitchell Motor Co.

W. Earl Clayton has been appointed general manager of the Derf Manufacturing Co., New York City. He has been connected with the company since the first of the year and since that time has increased its sales over 1000 per cent. The output of the company has reached a production of a thousand Derf spark plugs a day and plans are being made for greatly increasing the output during the next few months. The company has been reorganized and Fred Gerken continues as president.



W. Earl Clayton, General Manager Derf Manufacturing Co., New York City.

W. S. Carleton, who was formerly connected with the sales department of the Republic Rubber Co., has joined the Emergency Fleet Corporation of Boston. For nine years he has been with the Republic Co. and has been succeeded by Corliss Wadleigh.

William J. Butler has been appointed assistant treasurer of the Bigelow-Willey Motor Car Co., Philadelphia, Pa., distributors of Paige cars. For three years he was connected with the Willys-Overland Co., and afterward with the Overland-Happer Co. as secretary and office manager.

J. F. Plunkett is now associated with the Iowa Motor Co. at Omaha, Neb. He is to be director of sales under H. H. Cannon, western manager.

F. A. Mentges has taken a prominent place in the sales department of the United Motor Service, Inc., of Detroit, Mich. He has been assistant director of service for the Remy Co., Anderson, Ind.

William F. Edwards, who has been sales manager of the Goodrich-Lenhart Manufacturing Co., Philadelphia, Pa., will distribute the products of the company throughout the West. His headquarters will be in Chicago.

M. D. Millner has joined the purchase department organization of the Dart Truck and Tractor Corporation. He will assist in securing materials. Frank Wermes has taken charge as superintendent and production manager and F. W. Kleist, John R. Williams and Dwight L. Mink have been added to the sales department.

Robert A. Stranahan has enlisted in the naval air service. He was formerly president of the Champion Spark Plug Co. of Toledo, O.

George B. Cullen is now assistant manager of sales for Knickerbocker Motors, Inc., New York City. He was formerly associated with Sandow Motor Truck Co., Chicago.

E. H. Delling succeeds C. E. Broad as chief engineer of the Stanley Motor Carriage Co., Newton, Mass.

Homer Beckenbach has entered the service as inspector in the drop forging department of the ordnance department in Detroit. He was formerly assistant sales manager of the Cleveland branch of Willys-Overland Co.

H. S. Benjamin is now sales manager of the Holly Carburetor Co. of Detroit, Mich. Previous to that he had been general sales manager of the Saxon Motor Car Corporation.

A. B. Walker has resigned as representative of the Budd Wheel Corporation, Philadelphia, to join the staff of the bureau of aircraft production. He has left for an eastern station.

Orrel A. Parker, formerly manager of the wheel department of the Hydraulic Pressed Steel Co., has gone to Washington to engage in government work. He is in charge of records under W. F. Parrie, chief of the oil and lubrication branch, supply section, in the office of the director of military aeronautics.



B. H. Boensch, Manager New York Branch of Bearings Service Co.

H. D. W. Mackaye has entered the government service in connection with munitions production and is located at Jackson, Mich. Mr. Mackaye has been connected with B. F. Everitt in the receivership settlement of the affairs of the Ross Automobile Co.

O. F. Conklin has been appointed general manager of the Remy Electric Co. He was formerly chief engineer of the company. **G. V. McMahan**, sales manager of the motor equipment division, has been appointed assistant general manager.

George L. East has become associated with the Gulf Oldsmobile Co., New Orleans, La. He has resigned as assistant sales manager to the Olds Motor Works, Lansing, Mich. He will distribute the Oldsmobile throughout Louisiana. Mr. East started with the Olds company in 1907, which includes five years as advertising manager, several years as wholesale representative and 1½ years as assistant sales manager.

Dr. E. A. Wullenweber, connected for many years with the Morgan & Wright factory in Detroit, has joined the Mid-Continent Tire Manufacturing Co. of Wichita, Kan.

H. A. Waterbury has been appointed advertising director of the Essenkay Co. and **A. H. Lippman**, formerly in charge of the advertising, has resigned to join the colors.

E. S. Lee, Jr., has entered the army as first lieutenant in the Motor Transport Service Division. He is stationed at Camp Holabird, Md. He was formerly sales manager of U. S. Motor Truck Co.

D. V. Foster, who was formerly assistant general sales agent of the Midvale Steel Co., and later connected with the Washington office of the Midvale Steel and Ordnance Co. and Cambria Steel Co., has joined the sales organization of the Hess Steel Corporation of Baltimore, Md., will represent New York and New England territory.

L. H. Morrill, for the last two years in charge of the engineering department of the Northway Motors Co., has been appointed assistant engineer of the Buda Co., Harvey, Ill.

Howard C. Caldwell has resigned as assistant advertising manager of the Haynes Automobile Co., Kokomo, Ind. He has entered the Great Lakes Naval Training Station.



R. H. Spear, President of the All-American Truck Co.

F. W. McWilliams, associated with the Firestone Tire and Rubber Co., Akron, O., for a number of years, has been appointed eastern cycle tire and accessory sales manager of the company.

E. M. Beach has been appointed to the position of inspection of the bureau of aircraft production. He was formerly president of the Manufacturers Foundry Co., Waterbury, Conn., and also a member of the board of directors and executive committee of the Motor and Accessory Manufacturers Association.

H. M. Prewitt is now district manager in charge of the service station sales of the Detroit branch of the Willard Storage Battery Co. **S. S. Jenkins**, formerly district manager at Detroit, has been appointed in charge of manufacturers' sales, with headquarters at Detroit.

H. O. Penland has been appointed manager of the Cleveland office of the U. S. Ball Bearing Manufacturing Co. He was formerly sales manager of the company.



Eddie Rickenbacher, Famous Racing Pilot, is an American Ace.

Overhauling The Chalmers 6-40 Engine

(Continued from Page 19.)

up and two down. The vertical shaft should have about .004 inch end play.

Now connect up the oil lines to main bearings, making sure that they are clear of foreign material and that the oil holes in the center bearing caps line up properly. Next put the steel cylinder around the gear and connect up pump and oil line; also tighten the packing nut in the case. Look over all of the connecting rod and main bearing nuts to make sure that all cotter pins are in place. See that oil overflow lines from front and rear bearings empty into the splash pan and after this is done the lower part of the engine is finished.

Going now to the cylinder head, first mark all the valves so as to know where they belong. Remove the tin cap on the top of the valve and the felt and leather washer. Notch the end of a board and press down on the valve spring and pull out the key. Grind the valves until there is a nice polished streak clear around both the valve and seat. Before reassembling the valves drill four $\frac{1}{8}$ inch holes around the bottom of the lower spring retainer and a small one near the top of it. This allows any oil that may get inside to run out again instead of working down the valve stem and thus into the cylinder.

Lay the rocker arms in their places, or at least one of them and see where the corners and belly will be apt to strike the valve cap. Then grind some of the arms in those places. Adjust the cam bearings before putting the rocker arms in place, getting them snug enough so that the shaft can be turned by hand with one bearing tight. When all bearings have been adjusted in this manner remove the camshaft again, replace the caps and nuts so as not to lose any shims. Replace the lower part of engine in the chassis, put on a new copper gasket and set the head on the engine, screwing all nuts down as tight as possible.

Put all rocker arms in place and tighten down all brackets except the timer gear bracket. Lay the camshaft in and tighten down bearings. When laying shaft in have it in position so that No. 6 inlet cam, which is the last cam, is pointing straight up. Then adjust the rocker arm under this cam so that it will just move freely. Take the vertical shaft sleeve and slip the gear on it. We are now at the point where most mechanics fall down on the job.

Timing the Valves and Ignition.

After arriving at this point it should not take over five minutes to completely time the engine. Put plain washer on the gear and screw the nut down tight. Turn the crank until No. 6 inlet valve is just about to open. To tell when the cam has reached this point have someone keep moving the arm sideways while

you turn the shaft and when he can no longer move it you will know that the valve is ready to open. Now we know that when No. 6 inlet valve starts to open No. 6 piston must be at top dead center, so now loosen the vertical gear nut and if the gear is fitted freely on the sleeve you can turn the crankshaft around until the mark "D-C 1-6 In. O," is directly under or not over a half inch past the pointer, and the camshaft will not move. Then put the lock washer under the nut, tighten the nut down and test it again to see if valve opens in the proper place. Then remove nut and washers and put set screws in and tighten nut. With No. 6 inlet valve about to open and flywheel mark just past the pointer, stand on the left side of the engine and take a long screw driver and pry up the timer gear until it will turn around by hand. It will then be noticed that the slot in the timer gear shaft is cut off center, so turn the gear around until the wide part is towards your side of the engine and the slot is about parallel with the camshaft. Now let the gear down in mesh and tap the whole bracket down in place and the gear will turn so that slot is pointing at a spot about half way between the rear cam bearing and the corner stud. Set the timer on, turn the brush around until it sets down in the slot and turn the housing to the left until the arm points to the left of a point straight in front of the timer. Then turn it to the right until you hear a click, which should occur when the arm is pointing at right angles to the engine. If it does not click in proper place lift up the gear and move it around one tooth at a time until it does click properly. The engine is now timed so adjust the rest of the tappets, put on cover and the overhaul is complete. The engine fires 1-4-2-6-3-5.

EARNINGS OF PIERCE-ARROW MOTOR CAR CO. INCREASED.

The net operating profits of the Pierce-Arrow Motor Car Co., Buffalo, N. Y., for the three months ending June 30 were \$1,523,421, or \$220,045 over the earnings for the corresponding period of 1917.

Moco Monkey Grip Tire Patch has made one of the most phenomenal sales records since its introduction on the market of any similar article ever offered to the motoring public. It is manufactured by the Moco Laboratories, Oklahoma City, Okla., and Mt. Vernon, Ill., which company has enjoyed an increase in business in less than three years from gross sales of \$50,000 to nearly \$1,500,000. According to the manufacturers it has been recognized by the government as a standard tube repair method and is being used for repairing punctures, blow outs and holes in tubes in practically all the cantonments. It was adopted after tests had been made of 67 cold patches and tube repair methods.

Farley & MacNeill, 105-107 Federal St., Boston, Mass., have been appointed exclusive agents for the Moco Monkey Grip Patches in the northeastern states, being sole distributors for New York, New Jersey and New England.

NEW SPEED REGULATIONS IN CAMBRIDGE, MASS.

The Massachusetts Highway Commission has approved the special regulations made by the Board of Park Commissioners of the City of Cambridge, Mass., and has issued a notice that no person shall operate an automobile or motorcycle at a rate of speed in excess of 25 miles per hour on the Charles river road in the City of Cambridge, between Cambridge bridge and Mt. Auburn street; and that no person shall operate an automobile or motorcycle on any curve on said road at a rate of speed in excess of eight miles per hour.

FIND SHORT MEASURE GASOLINE PUMPS IN N. H.

A crusade has been started in New Hampshire to discover the cause of the many complaints on the part of motorists that they are victimized by gasoline dispensers, and the commissioner of weights and measures of the state has called in the services of all the men in his department to inspect the 4000 gasoline pumps throughout the state.

HAL C. SMITH KILLED IN ACCIDENT.

Hal C. Smith, treasurer of the Carl M. Green Co., Detroit, Mich., received injuries in an automobile accident from which he died on Aug. 1. He was 34 years old and well known throughout the automobile industry. At one time he was advertising manager of the General Motor Truck Co.

CONAPHORE LENSES FOR PIERCE-ARROW CARS.

The Edward A. Cassidy Co. of New York City has announced that the Pierce-Arrow Motor Car Co., Buffalo, N. Y., will use Conaphore headlight lens, made by the Corning Glass Works, Corning, N. Y., as standard equipment on its passenger cars. The Cassidy company is exclusive wholesale distributor of Corning lenses.



DORT OWNERS USE CARS PRINCIPALLY FOR BUSINESS.

A recent canvas of Dort owners in the city of Detroit showed that 82 per cent. are using their cars wholly or principally in business and consider them indispensable.

"This represents about 850 Dort owners," says one of the Dort officials, "and it opens the mind to an interesting line of thought. We have no data as to just how much time these owners are saving by using an automobile in preference to other means of conveyance, but let's be ultra conservative and place it at half an hour daily. So then we have a time saving of 425 hours a day on the part of Dort owners in one city alone.

"On that basis these owners in the city of Detroit—which should be typical of this and other cities—save in a year of 300 working days, 127,500 hours.

"This, mind you, represents a saving by the owners of only one make of passenger automobile in one city. When you consider that there are about 5,000,000 cars contributing to the transportation facilities of this country, an appreciation of the indispensable utility of passenger motor cars cannot be avoided."

CONTINENTAL GUARANTY CORPORATION DIVIDEND.

The board of directors of the Continental Guaranty Corporation on July 22, 1918, declared a dividend of two per cent. for the quarter ended June 29, 1918, on the capital stock of the corporation, payable July 25, 1918, to stockholders of record at the close of business July 23, 1918.

The Ajax Touring Refrigerator is made in trunk form and contains three compartments, two for eatables or bottled goods and the third for ice with a threaded compartment to prevent water leakage. It attaches to the running board and is air tight and dust proof.

Manufactured by the Ajax Trunk and Sample Case Co., 144-150 West 18th St., New York, N. Y. Price, \$20.



Ajax Touring Refrigerator.

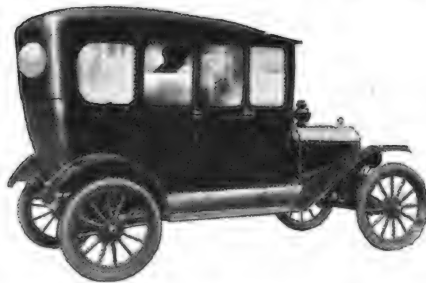
(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Overnight Bag is designed particularly for the business woman for use on trips entailing an overnight stay and for week-end visits. It is large enough to hold a night gown, shirt waist and a few other small articles. Fifteen toilet necessities made of ivory pyralin are fitted inside the cover. The case is made of high grade fabrikoid, a pyroxilin coated leather substitute of great durability. This material is quite as beautiful as leather. Is water, dirt, grease and stain proof and can be kept immaculate with soap and water. The case is lined with either fabrikoid or cloth of a harmonizing color.

Manufactured by the Du Pont Fabrikoid Co., Wilmington, Del. Write for prices and literature.

The Anchor Top and Body is built in a complete line of demountable winter tops for Overland, Oakland, Buick, Ford, Dodge and Oldsmobile cars.

These tops are strongly constructed throughout, being built of selected hard wood stock, reinforced with steel. This frame is then covered with a high grade



Anchor Top and Body.

luster lasting water proof material and the interior is attractively lined in a soft gray cloth. All windows are of extra heavy crystal glass. Doors are so arranged that they open and close with the regular body doors of the car (except Fords). Windows of doors are provided with drop glass panes, which may be raised or lowered as desired, thus insuring ample ventilation at all times. Anchor tops fit snugly to the regular body of the car, with no overhang or unsightly attachments of any kind. All tops are shipped in such a manner that it is a very easy matter to install them on cars satisfactorily. All necessary attachments are furnished and as tops fit to regular body irons of car and are held there firmly by means of special irons, no difficulty should be experienced in getting tops on properly. Complete instructions are furnished and each iron is plainly marked where it is intended to be used. A large stock of all models are carried at factory for immediate shipments. However, in order to avoid delay in transportation dealers are advised to place orders early.

Manufactured by the Anchor Top and Body Co., Cincinnati, O. Write for prices and literature.

JORDAN SPORT MARINE WILL BE CONTINUED.

The adaptability of the four-passenger car to personal driving, in view of the shortage of chauffeurs, has brought out the announcement from the Jordan Motor Car Co. that the Sport Marine will



Overnight Bag with Pyralin Toilet Set.

be continued as a regular Jordan model for the coming year.

In connection with this announcement, Edward S. Jordan, president of the company, reviews the history of automobile selling, recalling the time when salesmen sold cars on their mechanical features, the full-floating axle against the semi-floating, the four-cylinder motor against the two, the six against the four, and so on.

Today, he points out, the car that suits the public taste is the car built of standard parts, approved and accepted by long use, with a body of stylish lines, suitable for the particular style of driving in vogue and fully equipped. Such a car is the Jordan Sport Marine, which was designed for the man who drives his own car and who wants all the things that make driving comfortable and safe.

The Imperial Auto Folding Chair was primarily designed for a convenient auxiliary folding seat in an automobile. It folds compactly in a small space when not in use and is an ideal chair for the camp, beach, launch or car. The seat and back rest are padded with felt and upholstered in black water proof art leather. The frame is made of special oval formed steel finished in black enamel. It is made in several sizes to meet various needs.

Manufactured by the Imperial Bit and Snap Co., Racine, Wis. Write for prices and literature.



Imperial Auto Folding Chair.

Activities in the Motor Vehicle Industry

Latest News of the Business and Building Plans of the Leading Car and Parts Makers and Reports of Developments in the Trade.

The Imperial Brass Manufacturing Co., Chicago, Ill., has just opened a new welding shop and are open for orders from manufacturers who have government contracts to make tanks, cans, contain-



New Welding Shop of Imperial Brass Manufacturing Co.

ers, ovens, etc., which require the joining of metal to metal. This welding shop is one of the most thoroughly equipped in the country and maintains a staff of expert welders, who are in a position to help manufacturers to make prompt de-

The Gary Motor Truck Co., Gary, Ind., has increased its capital stock from \$175,000 to \$1,000,000. Additions will be built to the plant to increase production from the present rate of 500 a year to 1500 a year. The management has not been changed. The production has been increased several times.

The Bound Brook Oilless Bearing Co., Bound Brook, N. J., has insured all employees who have been in the service of the company for three months. They are insured for \$500. The expense of the policies is paid by the company and the insurance plan applies to employees at the Bound Brook plant and the two factories at Lincoln, N. J.

The C. A. Dawton Co., De Pere, Wis., is completing work on a two-story addition, 40x120 feet. This addition will be used for the forge shop, pattern making department and machine shop. A new boiler room 36x40 feet is also being

The Highway Trailer Co., Edgerton, Wis., is erecting a new shop 50 by 250 feet. James W. Manhall is general manager. The company is working on government contracts for trailers for hauling airplanes, ordnance and quartermaster supplies.

The Twin Fire Spark Plug Co., Detroit, Mich., has moved to a larger factory at 720 Grand River avenue. The company has also enlarged the dealers organization considerably.

The Timken Roller Bearing Co., Canton, O., has increased its capital stock from \$200,000 to \$1,000,000.

The Western Reserve Rubber Co., Akron, O., has increased its capital stock from \$10,000 to \$50,000.

The Knight Tire and Rubber Co., Canton, O., has increased its output from 200 to 760 tires a day.

The John Obenberger Forge Co., Milwaukee, Wis., is erecting a forge shop addition for the manufacture of crank-



Champion Spark Plug Salesmen and Their Wives at Midsummer Convention in Toledo.

liveries, keep up production and reduce manufacturing costs. The oxy-acetylene welding process, used in this shop, is far superior to riveting in making metal joints. Broken automobile parts and machinery of all kinds are also quickly repaired at the welding shop, which is perhaps the largest in the middle west. This department occupies a new building 50x150 feet, erected especially with a view to speeding up government contract work, and is ready to give exceptional service. Those interested in securing such service should write to Imperial Brass Manufacturing Co., 1200 W. Harrison street, Chicago.

The Ever-Wear Rubber Co. of Milwaukee, which was recently organized with a capital stock of \$200,000, will manufacture a new inner tube. The inner tire is the pneumatic type and is protected by a cellular cushion hoop separating the tube from the casing. The officers of the company are: President, Andrew Steel; vice president, William A. Schacht.

erected. They are manufacturers of gasoline engines.

The Hardman Tire and Rubber Corporation, Belleville, N. J., was reorganized in July and business will be continued under the name of the Hardman Rubber Corporation. An addition to the new plant will be erected. The present production is 125 tires a day. When the addition is completed the production will be increased to 450 tires.

The Paige-Detroit Motor Car Co., Detroit, Mich., has increased the prices of its cars which are as follows: Model 6-39 has been increased \$120 and will sell at \$1515; model Essex, 6-55, has increased \$155 and will sell at \$1985; Larchmont, 6-55, has increased \$140 and will sell for \$2090.

The Falls Motors Corporation, Sheboygan Falls, Wis., is erecting a machine shop addition. This will be a two-story building 60x125 feet and will be used for completion of government contracts for truck, airplane and tractor engines and parts.

shaft, camshaft and similar forgings for the government. The present plant has undergone constant enlargement during the past nine months.

The Limousine Top Co., Kalamazoo, Mich., has secured a contract for the erection of a new building to its present plant. Work on the structure has already begun.

The C. R. Wilson Body Co., Detroit, Mich., is erecting a three-story addition to its factory at Clay avenue and Grand Trunk railroad.

The Motors Metal Manufacturing Co., Detroit, Mich., in order to take care of a government order for metal parts to be used for ambulances, is erecting two large additions to its plant. One building is 60 by 200 feet and the other is 50 by 60 feet.

The Chevrolet Motor Co., Flint, Mich., has advanced the price on its models and are as follows: The Baby Grand model, \$100, from \$995 to \$1095, and model 490, \$50, from \$685 to \$735.

The Bailey-Drake Co., Chicago, Ill., has moved its main offices to 1118 South Michigan avenue. The company has branches in Minneapolis, Kansas City, Seattle and San Francisco. The company represents manufacturers selling the jobbing and manufacturing trade.

The North-Light Motor Co., Toronto, Ont., with offices in the Wesley building, has taken over the two-story factory at Hamburg, formerly occupied by the Silversmith Manufacturing Co. A four-cycle high speed gasoline engine for boats, automobiles, trucks and tractors, as well as stationary engines, will be manufactured.

The General Aluminum and Brass Manufacturing Co., Detroit, Mich., will enlarge the factory by adding an extensive scale of factory buildings. The buildings

engage in assembling one-ton war trucks. Later it is planned to manufacture engines, axles and other parts patented by the company.

The B. F. Goodrich Rubber Co., Akron, O., announced that the best half year in its history ended June 30. Earnings amounting to \$7,150,000, were practically \$2,000,000 ahead of either six months period last year.

The Joseph Dixon Crucible Co. has issued a booklet called "Evidence." This was made necessary on account of the company receiving so many letters from the trade telling of the increase in sales. The sales of Dixon's graphite automobile lubricants have been increased 100 per cent.

The Motor Appliance Co., East Moline, Ill., has taken over the plant of the Og-

ing out a standard one-ton truck with a 43 horsepower motor, which is designed to burn either gasoline or kerosene. The machine will use the Hotchkiss drive. The chassis will list at \$995. The president is R. H. Spear; Robert J. Sutton, vice president, in charge of manufacturing. The treasurer of the company is G. W. Barden, for a number of years secretary and treasurer of the Kelly-Springfield Motor Co., as well as being connected with a number of financial houses.

The J. H. Koehler Motors Corporation, Newark, N. J., has appointed the following agencies as distributors of Koehler trucks: John E. Watson, Woodstown, N. J.; Sauner Hardware Co., Shamokin, Pa.; J. Calvin Boyer & Sons, Mt. Pleasant Mills, Pa.; High & Trout, Pottstown, Pa.



The Plant of the La Crosse Tractor Co., La Crosse, Wis.: 1, Machine Shop; 2, Tractor Assembly and Paint Shops; 3, Pattern Shop; 4, Machine Shop and Iron Foundry; 5, Engine Testing Shop; 6, Sheet Metal Shop; 7, Storage; 8, Storage; 9, Final Testing Shed; 10, Iron Foundry; 11, Steel Foundry; 12, Experimental Shop; 13, General Offices; 14, Iron Foundry.

are being added to the company's group and are to be used in completing war work for the government. The new units are as follows: Aluminum factory, two stores, 100 by 100; brass furnace building, 40 by 100, to be equipped with sand bins in the basement and with simplex and coke furnaces.

The Scripps-Booth Corporation, Detroit, Mich., has advanced the prices of its cars and are as follows: Model 6 touring, formerly selling for \$1195, now \$1385; model 4, touring, formerly listed at \$985, now \$1065. The price of the eight-cylinder model remains the same. The new six-cylinder coupe and sedan models, known as models 42 and 41, will be sold for \$1985. The company will bring out a new model K semi-coupe with a winter top. The price has not been set. During the month of July the company manufactured 750 cars.

The Auto Manufacturing and Engineering Co., makers of automobile trucks, is planning to move from Detroit to Ft. Wayne, Ind. The capitalization of the company is \$500,000. The company will

den Manufacturing Co., Plymouth, Ind. The new company is formed to manufacture automotive appliances, consisting of three specialties: The Marco speed recorder, the Benson automatic speed signal and Ogden parts. The Marco speed recorder is a mechanical device for recording instantly the exact rate of speed attained per hour, the total number of miles traveled and the number of stops made.

The Owen Magnetic Motor Sales Corporation, which handles the Owen Magnetic Car in the New York territory, will hereafter handle the Liberty. The Colonial Motors, Inc., of which John F. Plummer was president, handles the Liberty. Mr. Plummer has entered government service and the company has been dissolved.

The All-American Co., Chicago, Ill., is a new concern which will manufacture trucks. The company occupies the three-story factory building at Sacramento boulevard and Chicago and Grand avenues, formerly the plant of the Og-

The Motors Metal Manufacturing Co., Detroit, Mich., manufacturers of sheet metal parts for trucks, tractors and automobiles, such as hoods, fenders, gas tanks and pans, moisto-rizers and stampings, has found it necessary to erect an addition to their main plant, 65x260 feet, which building is already under way. This company at the present time is devoting approximately 70 per cent. of their output to government work on trucks for the signal corps, four wheel drive and three-quarter-ton ambulances. In addition to above they manufacture a line of Ford fenders and stream line hoods, which are distributed throughout the country by the large jobbers of accessories.

The Michigan Steel Castings Co., Detroit, Mich., is erecting an addition to its plant, which will add 53,700 square feet. Additional men will be employed. The building will be used for molding, core making and the engineering department. This building will be completed in the fall.



GOING HOME WITH BROKEN SPRING. (Figure 512.)

Spring breakage is not a common occurrence, but it sometimes does happen in the most unexpected places and it is advisable to know how to make a temporary repair to enable one to drive the car home or to the nearest garage where a new plate or spring can be fitted. A piece of well seasoned oak or ash, just over half the length of the spring and from $\frac{5}{8}$ to one inch in thickness, with some strong cord or soft wire. The breakage will probably be through the center of the springs on account of the holes in the leaves, for the center bolt weakens them at this point. The splint should be laid upon the topmost leaf as shown in the sketch, whereupon the frame of the car is jacked up so as to bring the spring and the axle to their relative position before the break. Splint and spring should then be firmly lashed together and to strengthen the job a block of wood may be wedged between the spring and the frame and the car will then be in a position to be driven slowly home. If the wooden block is not available a half brick may be used for this purpose and a jack handle in place of the splint should this be left at home.

A MECHANICAL TIRE PUMP. (Figure 514.)

How many times have you started on a pleasure trip or tour and was forced to blow up three or four tires in the hot sun, spoiling all pleasure and the rest that you anticipated.

We suggest a contrivance which will eliminate all hand pumping and inflate the tires easily and quickly.

Attach a heavy iron hook underneath each running board near the outside edge of the automobile. Bore a hole in the foot step of the tire pump large enough to take the hook. It will probably be found necessary to bend the plunger into an eye so that the bolt may be slipped through it. Obtain a length of strap iron long enough to reach from the eye of the pump to the hub wrench, which is placed over the hub of the rear wheel, as shown in the sketch. If the pump is provided with a rubber tube long enough it will be possible to inflate either of the three tires. The other tire may be inflated by placing the pump on

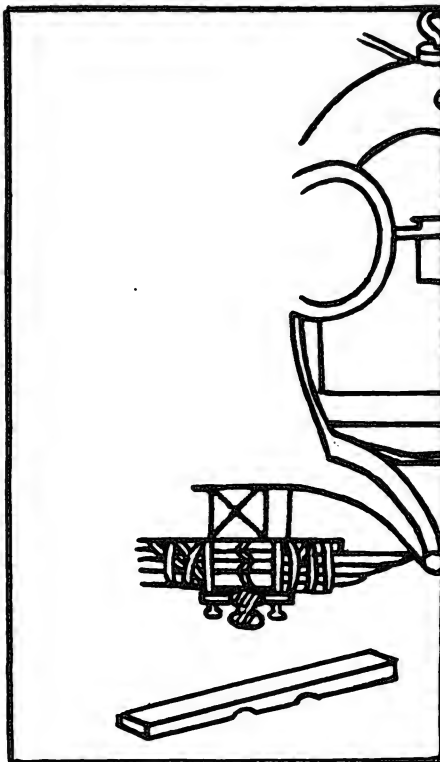


Figure 512.

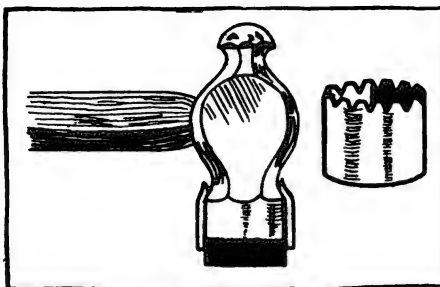


Figure 513.

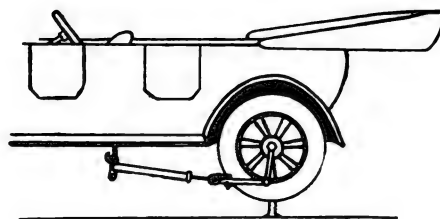


Figure 514.

the other rear wheel. As there are three ranges of speed it does not matter which way the wheel turns. Jack up the rear wheel, start the engine, throw in the clutch and let the engine do the rest. This method has been found practical.

MAKING A SOFT HAMMER. (Figure 513.)

In making an attachable soft head for a hammer a piece of ordinary metal tubing about $2\frac{1}{2}$ inches long is necessary so that it will slip easily over the head of an ordinary hammer. The tube is cut by means of a hacksaw into the shape of a V so that the V pieces may be bent over so as to clamp the device to the hammer. Into the tube projecting beyond the hammer should be poured molten lead, which when set will provide a very effective soft hammer. The lead must be left projecting of course and may be trimmed into shape, leaving about a quarter of an inch projecting beyond the head.

LEAKING PLUGS.

A great many automobiles are still in use with non-detachable cylinder heads and this type use valve plugs. These plugs often develop leaks which may be stopped by the application of ordinary stove paste or blacking over the threads. Too much should not be used. It may be applied at any hot joint in place of white or red lead.

HAVE YOU A BETTER PLAN?

When you read the suggestions on these pages do you compare it with the plan you already follow for a similar class of work? Could you improve on the suggestions expressed here? Would you criticise the ideas of the author? Does one of the articles bring to mind a scheme you have worked out for solving an entirely different problem. Then why, Reader, don't you write us about it? Why not give the other readers the benefit of your ideas along these lines? To grow is to keep step with the times, to make known your ideas—to pass along your own experiences, plans, shop kinks, etc. Write up a little item about your ideas and send them to the Mechanical Editor.

MISCELLANEOUS PRACTICAL SUGGESTIONS.

If one is out on the road and it is necessary to obtain gasoline for priming the engine when all other methods of obtaining it from the tank fail, a valve cap tied to a piece of string and lowered into the tank will suffice to draw up enough gasoline to prime one cylinder. This can be done as often as necessary and is a good thing to have in mind in an emergency.

When one is out in the country on a dark road at night and the battery is insufficient to enable one to see his way clearly, a half hour's running of the engine with the car standing will store up enough current to get back home.

When you feel the rear of the car skidding sideways don't apply the brakes. Throw out the clutch and steer into the skid. Point the front wheels the way the car is skidding and let the driving wheels turn as slowly as possible. It is sometimes advisable to apply more power and the car will naturally straighten itself out before serious damage results.

The experienced driver will always carry in the tool box a tobacco sack full of different sized nuts and another sack full of assorted washers and cotter pins. Accidents usually occur when far from home and these little items are invaluable in such an incident.

It is very common for a driver to squeeze his car against the curbing and if in a tight place is likely to injure the tires in trying to get away. A jack placed under the front axle and the car pushed away from the curb after it is raised will usually suffice to allow him to turn the wheels sufficiently to clear his car.

To prevent rust on tools use vaseline to which a small amount of powdered gum camphor has been added. These may be melted together over a slow fire and applied to the tool with a soft rag.

CLEAN THE TOOL BOX.

More than once it has been said that the average man has a strong objection to destroy anything that belongs to him, and that if the numerous things that he so carefully carries about in his clothing were to be gone over and analyzed he would find that most of them are not of the slightest use. This tendency to hoard up useless things not only extends to his person, but even to the motor car.

An inspection of the tool box in one's spare time will bring to light a useless collection of broken parts of spark plugs, nuts and bolts that have lost their thread, etc., and the motorist proudly considers that in carrying this assortment of useless junk that he is well provided for in an emergency. When anything is wanted quickly it is always difficult to find. It would, therefore, be considered time well spent to devote a few minutes spare time in cleaning the tool box. If a system is applied to the tool box much time and unnecessary trouble will be saved. All the miscellaneous nuts, bolts and washers should be put in

small boxes and packed snugly into the bottom of the tool box. The tools which one needs the most should be left near the top of the box and the other accessories graded downward according to the frequency of their various uses. This method applied to the private garage would not be without its advantages.

RECLAIMING DRY BATTERIES.

Many dry batteries are thrown away simply because one does not know that they can be reclaimed. This can be done at practically no expense and little time. Punch a number of holes around the zinc cover of the battery after removing the cardboard cover. Mix a saturated solution of sal ammoniac and water and keep adding the crystals until the water will dissolve no more after letting the solution stand for half an hour. This solution can then be strained and immerse the battery, taking care that the solution does not come over the top. Let the batteries soak for an hour or more until the cells have absorbed the solution to their full capacity. Remove the batteries and plug up the holes with wax or paraffin and return them to their cardboard containers.

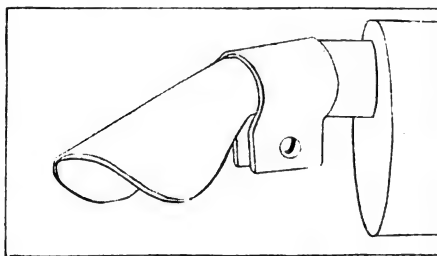


Figure 515.

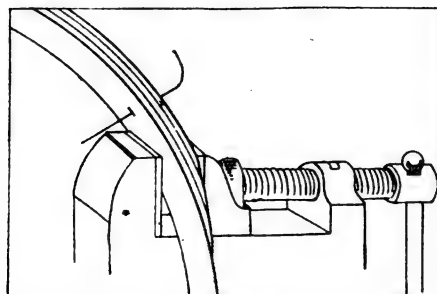


Figure 516.

DEFLECTOR FOR EXHAUST PIPE.

In some cars it so happens that the rear of the exhaust is placed in such a position that the gases as they pass from it into the open air are caught by the swirling air behind the car and sent up backwards over the rear seats.

A device to prevent this trouble is easily made by purchasing an adjustable spring clip and shaping a piece of tin into a cowl arrangement so that the gases upon striking this are sent downward and outward from behind the car.

OVERHAULING SPRINGS. (Figure 516.)

Rattling and squeaky springs are very annoying and while their overhauling is a dirty job it does not have to be done often and amply repays the operator for the labor spent.

The car must first be raised so that the wheels clear the ground and this may best be done with the aid of horses slipped beneath the frame. As the operator is working continually under the car this method is much safer, as it gives the car perfect stability and prevents the chance of the car slipping.

The springs are held to the frame by shackle bolts and to the axle by U clips. The shackle bolts are first removed, after which the axle and springs can be lifted clear of the car. The axle is then turned bottom upward, thus making the U bolts easily accessible. Between the axle and the U clips there is usually a strip of hard wood packing, which must be replaced when the spring is being re-assembled. After the U bolts are removed the spring will come free of the axle. The leaves of the spring are held together by a center bolt in most instances and the spring must be placed in a vise before this bolt is removed. The vise is then opened slowly and the leaves will separate, touching at the ends, whereupon a gap will appear about a half inch wide between the surfaces of the leaves. The contact surfaces of the leaves will probably be rusty, with a few brown polished spots where the uneven surface has rubbed for lack of lubrication. A stiff wire brush and some emery cloth will smooth away the rust, after which the spring may be thoroughly washed in soap and soda water and then dried carefully with a cloth. The spring should then be gone over with graphite, working it well into the pores of the steel. In replacing the spring leaves a thick piece of wire should be threaded through the center bolt hole of each leaf. This will cause the holes to line up when the assembly is clamped into the vise. The U bolts should not be tightened until the spring and axle is fitted to the shackle links, because the U clips allow a slight lateral movement of the spring on its table or pad on the axle. In this way one can tap the spring this side or that with a light hammer to set it more squarely upon the shackle bolts. After these have been tightened the U clips may also be taken up and the finished result will be an easy riding spring free from squeaks and rattles.

TO CLEAN THE HANDS.

For the car owner who does his own work the question of keeping his hands presentable is quite a problem. After the work about the car or garage is finished, a light oil, preferably cylinder oil, is rubbed upon the hands, using it just as soap and water are used. This method will work all the grease loose and then the hands may be wiped on a piece of clean waste or cloth, thus leaving the hands in good shape for thorough cleansing with soap and water.



Accessories Department



The **Blu-Streak Spark Plugs** have many advantageous points. The base or shell is made from large size carbon steel, carefully machined and finished. The side electrode, as well as the center electrode, is made from pure nickel alloyed with about two per cent manganese. The shape in which these electrodes are bent prevent their becoming fouled, as the oil drip is always below the spark. The insulation is made from approximately 50 inches of laterally wound mica. This mica is the finest grade obtainable. Owing to the unique construction of this plug the hotter the engine gets and the higher the speed generated the tighter the plug becomes. The tapered insulating mica tube and the tapered shell are all driven together until they can go no further. These plugs are all made accurately to standard and from the best materials obtainable.

Manufactured by the **Cumming-Forster Corporation**, Chicago, Ill. Write for prices and literature.

The **Auto-Kamp Trailer** enables one to live out of doors. It is a trailer to be drawn behind the car and when extended is a fully equipped home wherever one happens to be. It is a sleeping tent with two comfortable double beds, with real sagless springs, mattresses and bedding. It also has an ice box, two-burner gasoline stove, electric light outfit and table. The tent is water proof, wind proof and insect proof. It all folds compactly when on the road, under a dust proof, close fitting tarpaulin. It can be set up in seven minutes by one man alone. There are no bolts, nuts or clamps. The beds simply fold over on strong hinges. The tent frame is put in sockets, the bed legs are hinged and the whole is securely braced, being firm and rigid when in place. It attaches by universal socket and follows behind the car at any speed, over any kind of a road easily and silently.

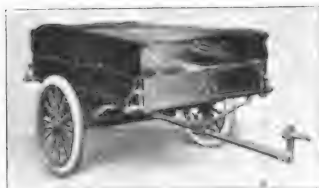
Manufactured by the **Auto-Kamp Equipment Co., Inc.**, Saginaw, Mich. Write for prices and literature.



Blu-Streak Spark Plug.



The White Valve Grinder.



The Auto-Kamp Trailer.

The **Patriotic War Service Emblem** is a paper sticker bearing the words "I will give a lift to a soldier or sailor going my way." It is moistened and stuck to the inside of the windshield. The makers say these are being purchased in large quantities by banks and business houses to be given away and are used on the cars of leading citizens in many of the large cities.

Printed by **Herschman & Cardy**, 167 Monroe St., Chicago, Ill. Write for prices and samples.

The **White Valve Grinder** is held in place by the operator with one hand, while with the other hand he operates the slide handle, giving the grinder a reciprocating motion and gives the valve a perfect seat free from ridges. The slide handle delivers the power over the center of the tool and there are no cranks to turn, no side gears, no bows to pull, all of which attachments for driving always serve to pull power off center of a valve the makers claim. This tool is light, strong and durable and will grind the valves of any car, and in many cases will grind valves where an ordinary valve grinder cannot be used. This tool has two small attachments on the lower end for valves that are either drilled or slotted and with its swivel attachment it is easy to get at the Ford valves under the dash.

Manufactured by the **White Manufacturing Co.**, South Bend, Ind. Price, \$2.50.

The **"Baseline" "Autowline"** is a quarter inch yellow strand power steel wire rope with patented snaffle hooks on each end especially constructed for towing disabled cars. It is manufactured of the highest grade steel, quarter inch rope, about 20 feet long, over all. This "over all" length includes two half-inch manila rope slings, which are joined to each end. It weighs 4½ pounds, coils up flat and can be tucked away under a seat cushion. This line can pull a 4000-pound car up a 20 per cent. grade.

Manufactured by the **Broderick & Bascom Rope Co.**, St. Louis, Mo. Write for prices and literature.



Patriotic War Service Emblem.

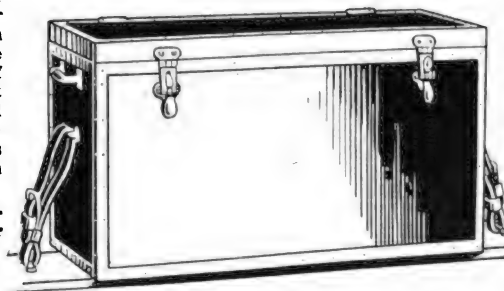


"Baseline" "Autowline."

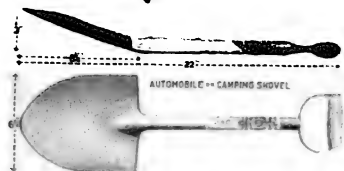
(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Economy Auto Case with 10 pounds of ice during the hottest summer weather will supply ample refrigeration for from 18 to 24 hours. Without the ice it may be used to keep foods warm. It is made of hard fiber board that is air tight and dust proof. Carried upon the running board it adds to the pleasure of touring by eating in the open, preparing the meals as wanted and keeping them fresh, clean and wholesome.

Prices and literature furnished on application to Traverse City Refrigerator Co., Traverse City, Mich.



Economy Auto Case.



The Wood Motor Shovel.

The Wood Motor Shovel is made in a convenient size to be carried in the tool box of the automobile. Its dimensions overall are 6¾ by 27 inches, while the digging space of the shovel is three inches by 8¼ inches. The necessity of this shovel when outfitting for a tour is easily realized and it is a valuable and essential accessory.

Manufactured by the Wood Shovel and Tool Co., Piqua, O. Write for prices and literature.

The Gordon Motor Crib is easily strapped to the back of the front seat and is held in an open position by a spring connection to the floor or back seat with an adjustable strap. When thus suspended it is free from vibration and does not interfere with entrance into the tonneau. An adjustable hood protects baby from the sun or wind and the crib is easily folded against the back of the seat when not in use.

Manufactured by the Gordon Motor Crib Co., 27 South Water street, Chicago, Ill. Price, \$10.

The Stewart Hub Odometer, model 118-A, with Ford hub cap, will fit any Ford axle. The Stewart hub cap is much stronger than the regular Ford model. It is very easy to install. Remove regular hub cap, put on odometer and fit the new hub cap over it.

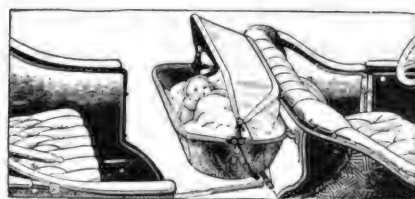
The odometer is enclosed and hermetically sealed in a case or cartridge, making it oil, mud, dust and moisture proof. It registers to 100,000 miles, forward and backward movement of the truck and repeats. Mileage cannot be changed without removing hub cap. On the other hand it is not necessary to remove hub cap to oil spindle and bearings.

As an added precaution against tampering a flange is provided by which the hub cap may be wired and sealed.

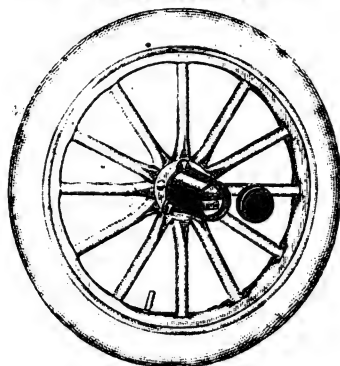
Manufactured by the Stewart-Warner Speedometer Corporation, Chicago, Ill. Stewart Hub Odometer, Model 118-A, with hub cap for Ford cars, \$12.

The Roedding Signal Tail Light is housed in a cylindrical shaped metal case, 10 inches by four inches. The makers claim it to be the simplest of the many signaling devices upon the market. Its operation is controlled by a toggle button mounted upon the steering column. When the button is pressed in the central position the horn is blown. When pushed to the right the letters "right" appear, two inches in height on a roller, which is inside the water proof case. When pressed to the left the letters "left" appear and other positions signal "stop" and "back," showing accurately the direction the driver intends to take.

Sole distributor, K. G. Barkoot, Detroit, Mich. Price, \$18.



Gordon Motor Crib.



Stewart Hub Odometer.



The Roedding Signal Light.



Bubbling Fountains.

Bubbling Fountains may be attached to the municipal water supply in any garage and they are made in a number of styles, plain or ice cooled. The wise garage man looks to the comfort of his employees for he realizes that as long as they are satisfied they will do their best work for him. The illustration shows style number 604, which is arranged to take 75 pounds of ice in a cork insulated refrigerator.

Manufactured by the Manufacturing Equipment and Engineering Co., Framingham, Mass. Write for prices and literature.

The "Safety First" Oil Signal is very simple in construction and is light and exceptionally well finished. There is nothing to get out of order and once it is properly installed it requires no attention. The principle is simple. As soon as the oil in the crank case gets low—within about 20 miles run of the danger point—a contact is formed at a given point, causing a light to flash, which is located on the dash in plain sight of the driver. The light will then burn constantly until the oil supply is replenished, which will automatically break the contact and the light goes out and remains out until the oil again gets low. It is so simple that it may be attached in a few minutes by anyone and is sent with sufficient wiring for complete installation.

Manufactured by "Go" Motor Speeder Co., Three Rivers, Mich. Price, \$4.50.



"Safety First" Oil Signal.

Eagleline Motor Oils and Gear Oil. Lubricating oil for internal combustion engines must be of the proper consistency, so that it flows freely and holds its viscosity, with a certain percentage of the resistance particles of the natural oil extracted and yet not too great a percentage of the lubricating base of the natural mineral oil removed, which gives it its quality for efficient lubrication. To ascertain the proper proportions in the refining of as near perfect a lubricant for gasoline engines as possible requires long years of experience. Eagleline motor oils were put through the most exhaustive tests for a period of 20 years and now have reached the zenith of perfection. They are refined from the natural mineral oil and contain no animal or vegetable fats that tend to decompose into glycerol and acids, which lower the lubricating efficiency. Eagleline gear oil is especially compounded to the exact consistency for efficient lubrication of transmission and differential gears and its use has shown that there is less wear on the gears and thereby upkeep expense is reduced to the minimum.

Eagleline motor oils and gear oil are put up in the company's trade marked containers that serve the purpose of cleanliness and convenience in use, as well as assuring the customers no spurious substitutes.

Eagleline motor oils and gear oil are prepared and marketed by Eagle Oil and Supply Co., 44-5-6 India St., Boston, Mass.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



The Clean-All Windshield Cleaner.

The Nazett Combination Burning-In and Work Out Machine will permit the average mechanic with a limited experience to burn-in all the main bearing and connecting rod bearings of a Ford engine in one hour's time and have a better job than could otherwise be obtained in several hours time. The machine is designed to be operated by a minimum amount of power, as most shops are equipped with small motors. It is amply provided with adjustments, provision being made for raising and lowering the cylinder block to allow proper alignment by means of positive and quick adjusting blocks, which slide in accurately milled grooves in the main bed plate. An expanding clutch is used with hard wood friction blocks controlled with turn buckles. Bronze shoes are used in the clutch throw out collars.

To test the tightness of the bearings during the burning in operation the knurled handle clutch lever is removed from its socket and inserted in the socket provided on the clutch arm, which enables the operator to turn the crankshaft by hand. It is not necessary to remove the cylinder block from the machine to tighten bearings or inspect same, as this may be done while the machine is running. Openings are provided in the main bed plate through which the valves are free to operate and permit the easy replacement of pistons. In fact it is not necessary to remove the block from the machine until it is ready to be bolted to the crank case. The heavy flywheel when under motion helps to maintain a more constant speed with a minimum amount of power.

To convert the machine into a work-out machine it is simply necessary to raise the two side arms, lock them into a vertical position and place the assembled engine into position. Convenient adjustments are properly provided for to align same. It is very essential to work the engine for a short time after it has been overhauled and this test will enable the mechanic to discover such defects as piston slaps, noisy timing gears and oil leaks. The machine is provided with brackets to attach the regular Ford coil box. A gasoline tank is equipped to connect the carburetor. Water connections for engine and oil drip pan are furnished.

Manufactured by H. H. Nazett, Eldora, Ia. Price complete, \$250.

The Walker Steelbilt Shock Absorbers for Fords smooth out rough going—soak up the shocks and cradle the Ford in a big easy car sway, the makers claim. They are built entirely of steel with the springs extra long, oil tempered and of the utmost durability. The spring bolts are turned from cold rolled steel and hardened—equipped with oilers. The free unhampered action given to both the coils and springs require no sliding parts and they are thoroughly safe and as strong as steel can be in every section.

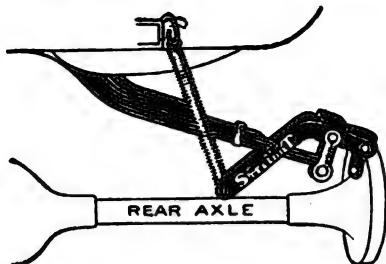
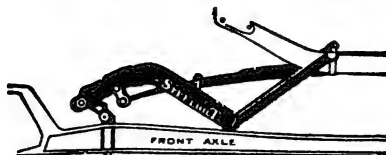
Manufactured by the Walker Manufacturing Co., 31 Hamilton St., Racine, Wis. Price, \$7.50 per pair.

The Clean-All Windshield Cleaner by its extreme neatness adds to the appearance of any automobile. This cleaner cannot rust or rattle. The windshield can be turned down with the cleaner attached and it is so designed that it cannot break the glass. It is always out of the driver's way, but never out of his reach and is constructed of the best material obtainable for hard practical use.

Manufactured by the Clean-All Windshield Corporation, 257 Washington St., Buffalo, N. Y. Price, \$1.50.



Holtzer-Cabot Gasoline Strainer.



Walker Steelbilt Shock Absorbers.



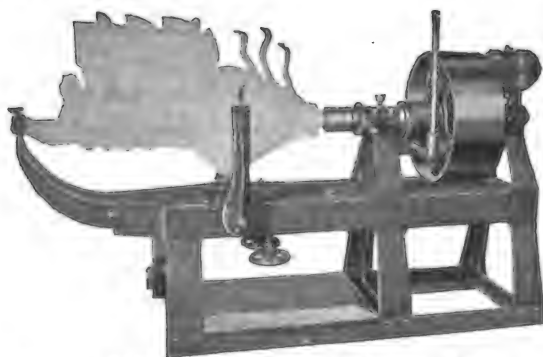
The Presto Bulb Tester.

Ekern's Portable Work Bench and Engine Stand is especially designed for use in Ford repair shops, although there are various uses to which it can be put in general repair shops. The stand is mounted on three four-inch diameter wheels. The rear castor wheel is constructed so that by pulling a plunger pin this castor will swing up off the floor and the stand will rest solidly upon its legs. It has two large trays 22x24 inches, where the workman can place his tools or engine parts. A Ford engine assembly can be attached to the stand by the two cap screws which hold the water inlet connection on the engine. The part attached to the engine will revolve in the clamp on the stand, adjusting the engine to the position most convenient to be worked upon. The bench is also equipped with a vise, which has a three-inch jaw with a four-inch opening. This vise will handle any work required in overhauling the Ford engine or other work of a similar nature.

Manufactured by the Ekern Bros. Manufacturing Co., Flandreau, S. D., and distributed by H. G. Paro, 1410-14 S. Michigan Blvd., Chicago, Ill. Write for prices and literature.

The Holtzer-Cabot Gasoline Strainer is made of an aluminum casting with a bronze wire screen of 120 mesh with over six square inches of surface. The gasoline enters through the bottom of the strainer and passes up through the screen, thus making it possible to remove all dirt and water that falls to the bottom of the strainer, through the screw plug at the bottom. The wire screen cap can be taken out by unscrewing the top wing nuts.

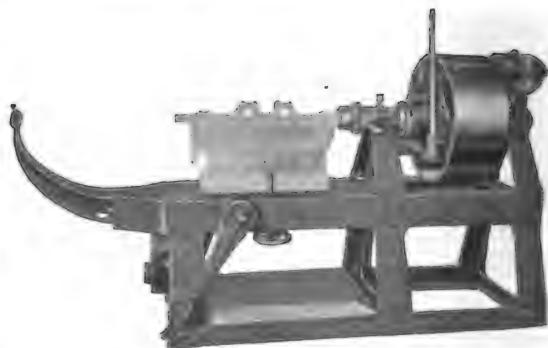
Manufactured by the Holtzer-Cabot Electric Co., Roxbury, Mass. Write for prices and literature.



Nazett Machine Working Out Motor.



Ekern's Portable Work Bench and Engine Stand.



Nazett Machine Burning-In Bearings.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



Nazett Connecting Rod Jig.

The Nazett Connecting Rod Jig is an aligning fixture for testing the alignment of new and used connecting rods for Ford engines. It is conservatively estimated that 50 per cent. of new rods are not true, and 97 per cent. of the rods in engines which have been overhauled are out of alignment. This condition invariably causing a knock which many a mechanic has looked for but could not find. The pins in the tool are made of high carbon steel, double heat treated, hardened and ground. The large pin is accurately fitted into steel bushings, which are also hardened and ground.

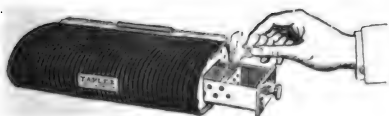
Manufactured by H. H. Nazett, Eldora, Ia. Price, \$30.

The Foster Auto Repair Creeper is mounted on ball bearing, free running castors and is durably finished in baked-on black Japan. Metallic throughout it stands up under severe usage and its advantages over the wooden creeper are evident. The galvanized link spring fabric supports the body comfortably and the head rests upon a cotton filled pillow. The give of the springs allows free movement and an adjustable arm anchors the creeper firmly to the floor so that the workman can exert his full strength.

Manufactured by Foster Bros. Manufacturing Co., Utica, N. Y. Write for prices and literature.

The Magic Vulcaniser is an ingenious little device that vulcanizes patches on inner tubes in five minutes time, disregarding all weather conditions. The patch is simple and effective. A lighted match applied to the chemically treated cartridge in the top of the tin cap provides the heat units necessary to penetrate the patch and in a few minutes the tube is perfectly vulcanized and ready for instant use. There is no flame, no danger of fire and the strongest wind cannot blow it out. The complete outfit, including clamp and 12 vulcanizing patches take up small space in the tool box.

Manufactured by Magic Auto Devices Co., Inc., Lynbrook, N. Y. Price, \$2. Extra patches, the dozen, \$1.



Taplex Foot Warmer.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



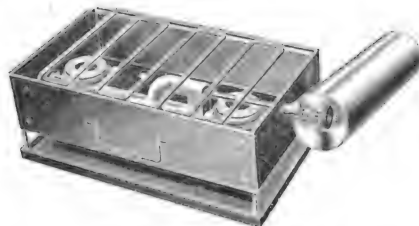
Magic Vulcaniser.



Foster Auto Repair Creeper.

The American Folding Camp Stove is just the thing for the camping or touring trip. It is efficient and dependable. Equipped with two powerful burners it uses gasoline, burning equally well outdoors as indoors. Weighing eight pounds its size folded is 3½x8x14 inches. It is simple and easy to operate, as there is nothing to set up or assemble. It can also be supplied with heating drum.

Manufactured by the American Gas Machine Co., Albert Lea, Minn. Write for prices and literature.



American Folding Camp Stove.



SELF-LOCKING

"Detroit" Crankshaft Tire Pump.

The Taplex Foot Warmer is for use in the automobile, camp, porch and for all other outdoor uses. On the coldest days it gives one that full measure of comfort and protection which makes the automobile ride a pleasure. It is lighted with a match and the fuel burns without flame or smoke, thus making it absolutely safe. The case is made of indestructible steel with nickel plated ends and a double asbestos lining.

Manufactured by the Taplex Corporation, 47 West 34th St., New York City, N. Y. Weight 5 pounds. No. 14, \$5; No. 20, \$7.50. Extra fuel, 12 bricks to a box, \$1.

BUICK VALVE REMOVER
PATENTED

Buffum Buick Valve Remover.

The Buffum Buick Valve Remover is quick, sure and safe, obviating the danger of bending washers, valve stems and valve springs or breaking the valve cage. It lifts the valve straight up with a strong, steady pull and fits Buick engines of all models since 1912. It is light and compact and occupies no more space than an ordinary wrench, being easily carried in the tool box.

Manufactured by the Buffum Tool Co., Louisiana, Mo. Price, \$2.

The "Detroit" Crankshaft Tire Pump is driven directly from the front end of the engine crankshaft, being attached in exactly the same manner that the hand crank is connected. It is locked in position and held from turning by a clamp or screw and is connected to the end of the engine crankshaft by a short ball joint shaft or coupling, which drives it. Each downward stroke of the piston draws in clean, cool air, and each upward stroke forces it through the tube into the tire. The only attention necessary is a spoonful of hard graphite grease about once a season. It is made as carefully as a little engine. Cylinders, crankshaft and pistons are ground to close limit. Regular engine type high compression piston rings are used and stand engine type valves are used. The outfit includes a 14 foot hose and connection for pocket gauge.

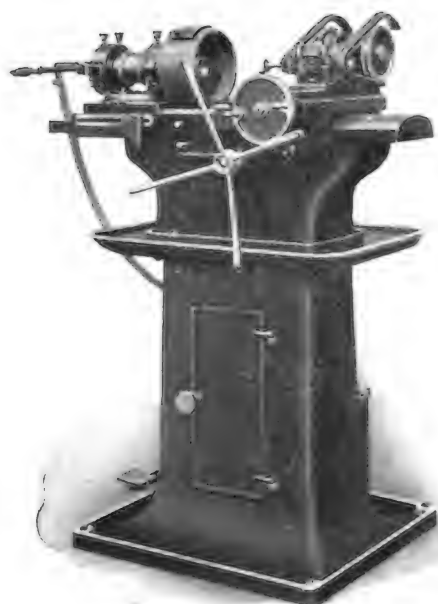
Manufactured by the Detroit Accessories Corporation, Gratiot and Fisher Aves., Detroit, Mich. Price \$12. Write for size adapted to your car.

The Woodworth Clear Light Lens for automobile head lights is a prism lens especially designed to prevent glare without absorbing light, but by directing its rays where they are most required. The upper half of the lens is so designed that it throws the light to the sides of the road and the lower half is designed to throw the rays down on the road itself. The lens is made in all of the commonly used sizes.

Dealers or jobbers can obtain a very favorable proposition on these lenses by writing direct to Woodworth Manufacturing Corporation of Niagara Falls, N. Y.



Woodworth Clear Light Lens.



Capital Internal Grinder.

The Capital Internal Grinder employs heavy construction with correct proportioning of detail and many labor saving devices. The spindles are fitted with ball bearings, all parts being machined in jigs, sliding parts scraped to surface plates and cylindrical parts fitted by grinding. The stand is a one-piece casting 29½ inches high. The base is bolted to the stand or can be mounted upon a bench and weighs 200 pounds. The table is a single unit, fitting in the ways on the top of the base, and is operated by the pinion and rack. The work spindle head is mounted upon a plate fitted to the table and the position of this plate is altered by loosening the lock bolts. It can be set to any angle up to 90 degrees. The grinding wheel head is built up in two sections. The wheel spindle forms the front part and the drive shaft head the rear part. The wheel spindle is designed to run at high speeds. The countershaft is in three sections, drive shaft, intermediate shaft and main shaft. A complete water attachment may be had if so desired.

Manufactured by the Lansing Stamping and Tool Co., Lansing, Mich. Write for prices and catalogue.

The Knickerbocker "Made Right" Motor Luncheon Outfit, as illustrated, is combined luncheon and suit case arranged, so that the entire equipment may be removed and the case used as an ordinary suit case when desired. This style is made in three sizes, suitable and equipped as desired for two, four, six or seven persons, and are furnished complete with cutlery and dishes or with just food boxes as desired.



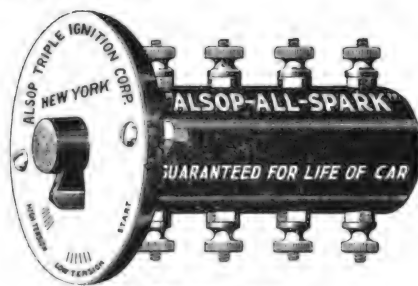
Knickerbocker Motor Luncheon Outfit.

sons, and are furnished complete with cutlery and dishes or with just food boxes as desired.

In addition the Knickerbocker "Pullman Diner" luncheon case and table and the Convertible Auto Refrigerator luncheon case and trunk are popular styles, offering most practical and convenient features. All cases have compartments provided for carrying two or more of any standard thermos or vacuum bottles or jars.

Manufactured by the Knickerbocker Case Co., Fulton and Clinton Sts., Chicago, Ill. Prices range from \$13 to \$42.50.

The "Alsop-All-Spark" is claimed by the makers to make possible the use of old dead carbon choked spark plugs with as good results as can be gotten from new ones without this device. It goes much further than the saving of spark plugs, as the reinforced spark is a more positive exploder of the gasoline. When it is considered that there are more than 5400 sparks per minute in a six-cylinder engine, which runs 3600 revolutions per minute and only a certain per cent. explode the gas, it can be readily seen that a device which gives such a powerful spark will penetrate through heavy oil and spark dead carbonized plugs, will certainly cause a great deal more explosions per spark delivered.



"Alsop-All-Spark."

With this device it is seldom ever necessary to change spark plugs, as a slight turn of dial on the dash will raise the voltage to such an extent that it will overcome any misfires, no matter in what condition the plug may become.

The device screws upon the dashboard and is controlled by a dial inside the car. It is connected between the spark plugs and distributor and will not interfere with any present equipment. The makers claim it to work equally well upon any ignition system. Easily attached in a few minutes.

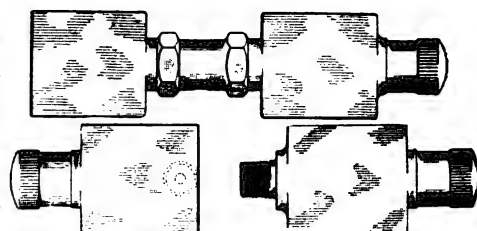
Manufactured by the Alsop Triple Ignition Corporation, 1765 Broadway, New York City, N. Y. Price for all four cylinder cars, trucks and tractors, \$6.

The Meckel Lubricator is a novel device, which lubricates springs, shackles and spindle bolts with oil instead of grease. The great difficulty in oil lubrication has been the control of the fluid and has been surmounted in this device by the use of a valve actuated by vibration, which permits the oil to flow only when the car is in motion. Stopping the car stops the flow of oil. The manufacturers claim the elimination of squeaks and rattles, freedom from attention except for refilling the reservoirs every 2500 miles. The attachment is simple. It fits into any of the bushings of the bolts and can be applied to a car by any one. It is made in three styles, each adapted to a special duty.

Manufactured by the Meckel Lubricator Co., 1507 Grace Ave., Lakewood, O. Write for prices and literature.

The Tong-Em-On Vulcanizer consists of a nickel plated vulcanizing tong, two copper pans—puncture and blow out sizes—and one dozen "Risk's Riskless" perforated fuses and patches.

To use, simply roughen the surface of



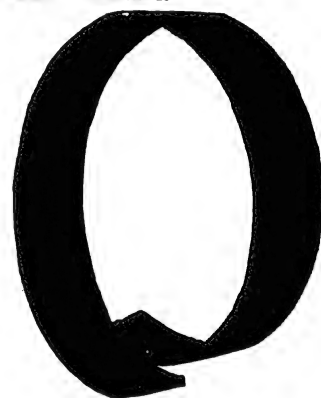
The Meckel Lubricator.

the tube thoroughly, peel off one of the gum patches from the stack and stick it to the bottom of pan. Remove the cloth and pull the tong tight, sliding the floating rivet back in slot to hold tong closed. Put two of the patented fuses into the pan and light with a match. The whole process requires but five minutes time and the makers claim a permanent repair is the result.

Manufactured by the Tong-Em-On Vulcanizer Co., 626 Plymouth building, Minneapolis, Minn. Price, \$1.75.

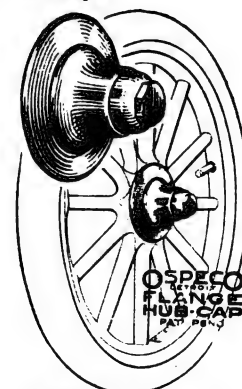
Rusco Brake Lining is manufactured by specially constructed machinery. The basis is selected long fiber pure asbestos, expertly interwoven with tempered brass wire. No cotton or copper filling is used. This makes an extremely durable, but soft and flexible fabric of uniform quality throughout. A secret compound is used to permeate the brake lining and render it impervious to water, oil, heat and dirt.

Manufactured by the Russell Manufacturing Co., Middletown, Conn. Write for prices and literature.



Rusco Brake Lining.

The Osprey Flange Hub Cap is designed to replace the original Ford hub cap. They are rugged and distinctive in design and add materially to the appearance of the car. They are easily installed by merely screwing them on just like the old hub caps.



Manufactured by the Michigan Auto Products Co., Ford Building, Detroit, Mich., and Cincinnati, O. Price, \$5 per set of four.



Tong-Em-On Vulcanizer.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Bowser "Chief Sentry" Gasoline Outfit is so designed that it will accurately discharge on a complete stroke of the plunger five gallons of gasoline. Any intermediate gallon, half gallon or quart can be accurately discharged by the use of the graduated scale, which is attached to the pump. The pump is built entirely of metal, strong and durably constructed. All working parts are carefully protected by the outer casing and are machined and accurately fitted. All joints that come in contact with gasoline are absolutely tight, thus preventing accidental evaporation or leakage. The cylinder is made of seamless brass tubing with no joints to break loose or cause trouble. The valves, valve seats, stuffing boxes, etc., are made of selected materials suitable for the liquids to be handled. The pump is equipped with an electric light post completely wired, with a socket at the top for the bulb. A white opal glass globe is furnished, which affords protection for the light bulb and makes an effective advertisement, as well as a bright light. The pump is effectively wired for connection to local service.

Manufactured by the S. F. Bowser & Co., Inc., Fort Wayne, Ind. Write for prices and literature.

The Apco Brake Shoe Adjuster fills a long needed want for the Ford car. Without these the Ford brake shoes when half worn are useless and of course must be removed. With this adjuster, which consists of specially hardened steel thimbles, which are driven over the brake shoe cams, the brake shoes may be totally worn. After their removal the adjusters may be used over again, as they do not wear out. The installation is a matter of a few minutes using a hammer. Each set is packed in a box weighing two ounces.

Manufactured by the Apco Manufacturing Co., Providence, R. I. Write for prices and literature.

The Zorger Glar-Klir Lens is composed of sectional cylinders one-half inch in width, with the axis horizontal. These sections are adjusted so that the rays cross or come to a focus three inches in front of the reflector. This gives a one-half inch spread every three inches or a two-inch spread every foot. The sectional cylinders are made so that the light does not attain an altitude of more than 42 inches in 200 feet. At 200 feet the spread from each one-half inch section of the glaring half of the reflector is 400 inches, 90 per cent. of which is stated to be below horizontal is diluted by diffusion approximately 800 times, not nearly sufficient to dazzle an approaching driver. The maker states that by using the cylinder he gets the same diffusion as any diffusing lens and in addition gets refraction or bending down of the rays. This lens bends rays of light down and diffuses them along the road where they are needed. The range of lighting from it is from 300 to 500 feet in front of the car, and a wide side light is thrown, showing clearly the side of the road.

Manufactured by the Zorger Lens Co., Inc., Champaign, Ill. Write for prices and literature.

The Niswander Rim Remover removes and replaces demountable rims in automobile tires. The contracting and expanding is done by right and left hand threaded rods operated by a hand wheel, which give an even and steady pull, contracting the rim from one to four inches, and the rim hooks, together with the rim braces, are so constructed that the harder the pull the tighter they grip the rim in either operation. It weighs 2½ pounds and folds to a length of nine inches, enabling it to be easily carried in the tool box. This tool will work successfully on any split rim and will save time, labor and the wear and tear upon the rim necessary without its use.

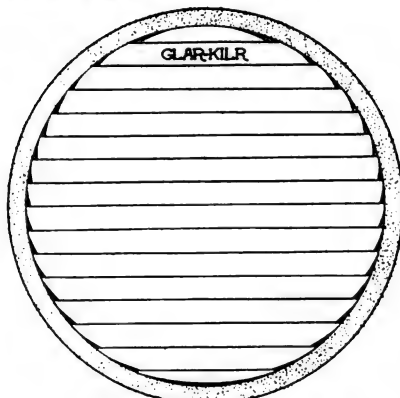
Manufactured by Niswander Manufacturing Co., Quincy, Ill. Price, \$3.50.



Bowser "Chief Sentry" Gasoline Outfit.



Apco Brake Shoe Adjuster.



Zorger Glar-Klir Lens.



Ever Safe Emergency Brake Shoe.



National Rubber Tire Filler.

Zit is an automobile dry wash—it takes off everything except a heavy coating of mud. It leaves a dry finish that makes the car shine. This polish restores the luster and keeps the finish from checking and cracking. It is good for furniture, as well as automobiles.

Compounded by the Westfield Chemical Co., Westfield, Mass. Write for prices and literature.

Blaxshine is jet black and of excellent covering quality, producing a black, durable finish with a shining surface like a new car fresh from the factory. The makers claim that it will stand up under any degree of heat, being especially adapted for re-enameling hoods, radiators and metal running boards. It can be put on by anyone after the car is cleaned and the enamel will dry during the night, leaving the car ready for use the next day. The package includes Blaxshine for one car, fine vulcanized brush, painter's cup, mineral wood, sandpaper and your personal monogram in gold shipped by post in corrugated metal.

Manufactured by the Twin City Varnish Co., 206 N. Wabash Ave., Chicago, Ill. Price, \$2.85.

The Ever Safe Emergency Brake Shoes for Fords eliminates the drag on the brakes by allowing the expander to always lay flat with the jaws of the shoe, thus saving gas and oil. It is adjustable to the drum by enlarging the diameter of the shoe itself. By springing the jaws to one side, washers may be added or removed to take up for the wear of lining or drum, thereby allowing the expander or cam to lay flat with the jaws and a much longer travel of expander at all times, leaving the shoe suspended and contracted to its smallest diameter. It is easily installed without the drilling of holes and it takes the place of the regular cast iron brake shoe.

Manufactured by the Never Break Products Co., Bangor, Pa. Write for prices and literature.

National Rubber Tire Filler takes the place of air in the tire, doing away with the inner tube, thus making punctures, rim cuts and blow outs impossible. It is made in the best quality rubber, cut into small particles and vulcanized together in such a manner that the makers claim it will produce all the resiliency and easy riding qualities of air. It is not melted and run into the tire, but is moulded in cylindrical forms to fit the various sized casings, and is placed in the casings in lengths, after which the casing is pressed onto the rim with special tools provided for the purpose, giving the same pressure as a casing well inflated with air. When the casing wears out the filler can be removed and replaced in new casings.

Manufactured by the National Rubber Filler Co., Midlothian, Texas. Write for prices and literature.

The Oxygen Tank Truck consists of a pair of wheels on a short axle with a steel strap holding the oxygen tank that can be contracted to sufficiently hold the tank. The handle of the truck is of steel strap with a bolt and wing nut with iron handles welded on.

Manufactured by the Auto Repair and Storage Battery Works, 41 Union St., Portland, Me. Price of truck and handles, \$7.50.



(When Writing to Advertisers, Please Mention The Automobile Journal.)

Chalmers Takes Optimistic View of Situation

"We Have Been Assured by the War Industries Board," He Says, "That If Steel and Other Materials Are Available After The War Program Is Taken Care of, Our Industry Will Get Its Share and the Board Has Promised That We Will Get a Square Deal"

Hugh Chalmers, vice president of the National Automobile Chamber of Commerce, upon his return to Detroit from Washington after the recent hearing when the War Industries Board issued its order for the automobile industry to get on a 100 per cent. war basis by Jan. 1, 1918, stated that assurance was given him that the motor car manufacturers would obtain steel and supplies if there is any left after the needs of the war industries have been supplied. He has issued the following letter to the members of the N. A. C. C. bearing on the situation:

"Supplementing what Mr. Reeves has written to you with reference to the letters from the War Industries Board, it is only fair to say that we did not know that any publicity would be given to this letter, because we were assured by the members of the board it was not their intention to give any to this subject. They denied having given out any of the objectionable publicity in the past and agreed with us that we should have as little as possible.

"The attitude of the War Industries Board was this:

"It was very much pleased at the spirit shown by our members in voting for the 50 per cent. curtailment of passenger cars, but it felt it could not accept that agreement without obligating itself, indirectly at least, to give us materials on a 50 per cent. basis. This, of course, they cannot guarantee to do, either for us or for any other so-called non-war industry.

"The board feels that the curtailment will have to be greater than 50 per cent., but at this last meeting the board expressed the wish and desire for the automobile industry to continue in business; that they realized the importance of this industry to the country in its regular business of making passenger cars, and its particular importance to the government at this time in carrying out its war program.

"The suggestion that the industry go to war work up to 100 per cent. is, I believe, what the War Industries Board would consider an ideal situation, and I think this statement is made more as a warning to our companies to take on war work. The War Industries Board feels, of course, that any company's interests, that is engaged in non-war work, is best served if it has 100 per cent. war work, but the board never has in any conference expressed a desire for a 100 per cent. curtailment of passenger cars. But it feels that the curtailment will

have to be greater than 50 per cent. The War Industries Board has never discussed anything more drastic than a 75 per cent. curtailment.

"We have been assured again by the War Industries Board that if steel and other materials are available after the war program is taken care of, our industry will get its share, and the board has promised that we will get a square deal. But it will not under any circumstances make any definite commitments to our industry or to any other so-called non-war industry.

"We were somewhat handicapped in our discussion at this last meeting because the inventories were not all in and the board felt that it could not deal properly with the situation until these figures were available. However, after these figures are completed we are to have another meeting with them, when it will be determined what steel and other materials can be released to the passenger car manufacturers, and on what basis.

"I have written to President Clifton stating it may be advisable to hold another membership meeting after the inventories are completed, and we have had a chance to discuss the matter again with the War Industries Board. In order to expedite matters I would suggest that if you have not sent in your inven-

tory of materials that you do so at once, as failure to do so is only holding up further negotiations with the board for the materials which we need."

Another Advance in Price of Ford Cars

Increase of \$75 Brings Touring Model Up to \$525, Within \$25 of 1914-15 Price.

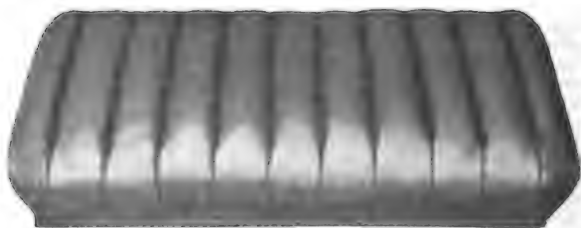
The Ford Motor Co. has again increased the price of the Ford car, adding \$75 on the price of the touring model, which has been selling at \$450 since February of the present year, when a previous advance of \$90 had raised the price to that figure.

In August, 1914, when the European war broke out, the Ford touring car sold at \$550. A year later the price was reduced \$60 to \$490 and in August, 1916, another cut of \$130 a car was made, bringing the price down to \$360. This was the lowest level reached and compares with \$525, the new price that went into effect this month.

The American Cushion Spring represents a new type of cushion spring brought forth to eliminate the rough riding qualities of many cars.

This type of cushion is fitted with what is known as the compound double deck de luxe spring. The upper deck of the spring contains approximately 120 coils of very light gauge wire. These coils are oil tempered and enameled so as to prevent any possible chance of deterioration or rust. After these springs have been enameled they are put in cloth covered pockets. These small pockets are then joined together by a universal metal hinged joint on the second coil down, leaving the upper coils perfectly free and loose, so that each spring works absolutely independent of the other, the entire 120 springs coming into action as the cushion is depressed, the upper deck lifting approximately 33 1/3 per cent. of the load that is put upon the cushion. The lower deck of the spring contains 42 very heavy springs, which are assembled and held together by a woven wire fabric that holds the springs in an upright position, at the same time making a strong and substantial base for the upper springs to rest upon. When the upper spring is compressed flat the lower spring is compressed approximately 50 per cent. of the height; in other words, the lower spring

lifts 66 2/3 per cent. of the load that is put upon it, the upper deck lifting 33 1/3 per cent. of the load, thereby eliminating all of the rough jolts that a person would otherwise get riding over the rough country roads or roads that have been



badly cut up by heavy trucks or other traffic, which is so often encountered during the hot season of the year.

This type of cushion is made to fit all cars that are built in this country regardless of size or price. Some of the more expensive cars are now using this type of spring but there are many of them that of course have not adopted the same. They are sent out on a money back proposition, allowing the customer to use them for five days and if not satisfied then they can be returned to the factory and the entire amount of the purchase price will be refunded in full.

Manufactured by the American Cushion and Spring Co., Kalamazoo, Mich. Write for prices and literature.

N. A. D. A. Explains Position in the Conservation Campaign

THE National Automobile Dealers' Association has issued a bulletin to members explaining its position in connection with the conservation campaign which it inaugurated as a means of aiding the war and the misunderstanding that arose over its objects, which were for the purpose of conserving necessary supplies and labor to aid in winning the war. The situation is presented as follows:

"Some apprehension was manifested during the past two weeks on account of an Associated Press story, which appeared in the newspapers under a Washington date line, to the effect that the oil division of the War Industries Board had not issued an order prohibiting the sale of gasoline nights and Sundays, indicating that this move was for the purpose of conserving gasoline and oil, and on the strength of this story hundreds of letters and telegrams from all parts of the country reached the President's office, asking for an explanation. To all of these the following telegram was sent:

"Closing was never urged to conserve gasoline but man power. Keeping open requires labor which is manifestly for the purpose of making it easier to use automobiles for pleasure purposes. As labor is one of the scarcest commodities, every saving in this direction at this time is not only necessary, but imperative. While there is no shortage of gasoline, yet it must be used rationally. There is not enough to waste and it behooves not only owners, but dealers to conserve as much as possible by cutting out unnecessary use, not because of present necessity, but against possibility of the future. National association encourages needful use, but discourages unnecessary use of automobiles in order to dispel idea that automobiles are purely pleasure vehicles and therefore non-essential. Closing will do this most effectively."

A further statement was issued from the President's office, same having been sent to all the motor trade journals and many of the newspapers throughout the country, which fully covers the situation and which indicates the position taken by the N. A. D. A. in this conservation movement. The statement is as follows:

"There seems to be some misunderstanding in conception regarding the night and Sunday closing recommendations, made by the War Service Committee, particularly as it applies to gasoline and other supplies which might indicate that the curtailment of the general use of automobiles is contemplated, or that a shortage of gasoline exists. Nothing is farther from the facts, as the object of the suggestions when fully in force will tend to foster and encourage the utility use of an automobile to the

fullest extent, and will cater to those who use cars for such purposes.

"As night and Sunday usage of an automobile is mainly for pleasure purposes, there is naturally a feeling that this can be reduced without any great hardship on the part of the owners of the cars, and it is freely stated that practically all other lines of industry are willingly curtailing the unnecessary from their business, and it is therefore only equitable that the automobile industry do likewise.

"The keeping open of service stations, oil and supply depots, requires labor, which is manifestly for the purpose of making it easier to use automobiles for pleasure purposes, and as labor is one of the scarcest commodities at this time every saving in this direction is not only necessary, but imperative. There is plenty of gasoline and oil for automobile use, if it is rationally and sensibly used, but there will not be enough if the automobile user continues to waste it by using his automobile unnecessarily.

"Therefore, it behooves not only the dealers, but the owners as well, to conserve in this direction as much as possible, not so much on account of present necessity as against the possibility of the future. Whatever small additional trouble it may be for the owner to obtain supplies on Saturday, it is so negative that no patriotic owner will object.

"Sensible reasonable use of the automobile on the part of the owner, and reasonable sensible attitude on the part of the automobile dealer, garage man, supply depot and oil station, is in itself an absolute assurance that no drastic order will be given requiring some limited use of automobiles, or of gasoline, oil or other supplies, and the possibility of a 'seven motorless Sundays' order, or any similar edict is very remote, and the closing movement on the part of the industry indicates very plainly its sincere desire to help in every way possible to bring about a speedy conclusion of the war and shows without question that the automobile industry is willing to conserve in all of the material that it uses in the operation of its product, as well as save the man power it requires to maintain the establishments considered necessary in the past."

In further support of the position taken by the national association that a reasonable sensible use of gasoline will prevent the necessity of drastic action is seen in the statement issued by the U. S. Fuel Administration Oil Division, under date of Aug. 1, which is as follows:

"United States Fuel Administration,
Oil Division, Washington, D. C.
M. L. Requa, Director.

Aug. 1, 1918.

"The question of gasoline conservation is of pressing importance.

"If the consumer will exercise care against waste it will postpone and probably avert the necessity of severe restrictive action.

"But if gasoline and other oil products are not conserved drastic means of control will be imperative if we are to meet the needs of our armies, those of the allies and our home demands.

"The consuming public should realize the seriousness of the situation, and yet there is no wish to enforce regulation that will hamper or restrict the legitimate use of automobiles, motor boats or gasoline engines. If everyone will be careful not to waste gasoline and lubricating oil there will be plenty to go around.

"But there is not enough gasoline and oil to meet all needs unless the thoughtless and careless waste is eliminated.

"A poster calling attention to this situation is now in preparation. It is desired to display the poster conspicuously at every gasoline filling station, in every public garage and wherever it will be seen by the consumer. The gasoline and oil distributing companies of the country must be relied upon to distribute these posters and other printed matter that is to follow, to awaken the consumer to the importance of conservation.

"It is believed that your organization stands ready to co-operate with this bureau in this work, and that you will see that posters sent you will be displayed where gasoline and oil consumers cannot fail to see them.

"Please let us know the number of posters you will require, estimating an average of three posters for each gasoline filling station and public garage you serve.

"A card for convenience in supplying this information is enclosed. Posters will be ready for distribution within a few days. Therefore please return the card without delay and oblige

Sincerely yours,

"United States Fuel Administration,
Oil Division, Bureau of Conservation.

"By C. C. Winningham,
"Chief of Gasoline Section."

A careful summing up of the situation in every locality is absolutely necessary in order that the automobile dealer may be in position to render the government the greatest possible assistance in this critical time, and nothing can assist more than the whole-hearted support of the entire automobile industry, including all of its kindred lines, in the conservation program now under way in the automobile trade.

Missouri Permits the Driveaway of Automobiles

The National Automobile Dealers' Association has again been instrumental in overcoming difficulties of automobile dealers—this time in Missouri. Recently several dealers were held up at Shelby, Mo., by an over-zealous night watchman. The dealers in question were not only delayed, but were fined. The national association was immediately appealed to and the president at once communicated with Governor Gardner.

The governor immediately took the situation up with the secretary of state, John L. Sullivan, with the suggestion that matters be clarified. Mr. Sullivan advised the president's office under date of July 23 that he had addressed communications to the prosecuting attorney of Shelby county and the justice before whom the dealers were prosecuted at Shelby, calling their attention to a request from Washington that dealers be allowed to drive cars in trains of 50 if necessary, displaying only the one set of plates—one attached to the front of the first car and the other to the rear of the last car.

Mr. Sullivan further advised that in accordance with the practise of a number of other states of the Union (which was due to activities of the national association) it was the desire of his department that dealers be allowed to travel unmolested when displaying the dealers' tags as above described. Mr. Sullivan advises he has replied to inquiries throughout the state that dealers in transit be not disturbed, and it is to be expected that no further inconvenience will be experienced in this connection.

LEATHER SUBSTITUTES GAIN WIDESPREAD POPULARITY.

Leather substitutes are materials produced from raw cotton, and they so closely resemble the real leather that few experts can detect the difference.

On account of climatic conditions in certain sections of the United States, particularly the South, leather upholstery on furniture and automobiles is not as satisfactory as the materials now being used as substitutes for leather because of the formation of what is known as "mould," a white fungus growth, which destroys the beauty of leather.

The formation of mould on leather causes a clouded, spotted surface, that finally destroys its texture, thereby rendering useless chair, couch or automobile upholstery, and necessitating new coverings and a continuous outlay of money.

The day of the leather substitute is here and here to stay, its many advantages assuring its success. When labor was cheap and plentiful, keeping this mould wiped off leather goods in damp

climates was a possible undertaking, but now that help is expensive and scarce, a labor saving material must be used. The value of the substitutes for upholstery is therefore obvious as they do not mould, fade or deteriorate. They have the further virtue of being water, grease and vermin proof.

In addition to the superior wearing qualities of pyroxylin coated substitutes in certain climates, there is just now a strong reason for using them in every part of the country. Our government has asked that we use substitutes of all kinds whenever and wherever possible. At this time there is a shortage of leather, which is indispensable in the making of shoes, belts, harness, puttees and other necessary articles for the boys who are fighting for us that we may enjoy the liberty of a world wide democracy. Now that our country is facing this leather shortage let us respond to the call "Use Leather Substitutes."

By putting before the public the value of leather substitutes as proof against climatic conditions, and by pointing out the duty of truly patriotic American citizens to conserve leather, the furniture and automobile manufacturers can render valuable service to their customers and to the country.

DU PONT ADVERTISING DEPARTMENT OCCUPIES IMMENSE OFFICE.

E. I. Du Pont de Nemours & Co. of Wilmington, Del., has sprung an innovation in advertising circles by equipping an immense office building solely for the use of its advertising division.

Through the expansion of its varied lines and the acquisition by purchase of a number of allied industries the advertising division of this great company has increased to such an extent that from a pay roll of 11 people in 1911, it has grown until it now numbers a force of 200 advertising experts and assistants, under the able direction of George Frank Lord, the company's director of advertising.

In the columns of Kaiser Wilhelm's subsidized press considerable space has been devoted of late to gloating over the alleged abandonment of foreign advertising and curtailment of home advertising by American manufacturers. The Du Pont company, however, is one to which the stricture of the Kaiser's press does not apply. Instead of reducing its advertising expenditures the Du Pont company doubled its appropriation for the present year over that of the previous year and is planning to increase the sum still further for 1919.

The courageous action of the Du Pont company in doubling its advertising expense at a time when business conditions bordered on the chaotic served no doubt as an inspiration to other great companies which have since been following in the Du Pont footsteps and are keeping their names and products constantly before the public eye.

Another important feature of Du Pont advertising is the pioneer idea of group

advertising of related industries, an idea which is certain to become typical of American advertising in the future.

Contrary to a generally accepted belief, the Du Pont company is not engaged solely in the manufacture of industrial and military explosives. In reality it is the greatest diversified industrial enterprise in the world. It manufactures more than 1000 peace products, which are widely used in the arts, sciences, industries and the home.

The advertising aims of the company are directed toward furnishing the public with complete information and education as to the uses and proper methods of use of their multiplicity of products. In consequence the importance of the advertising division has increased in proportion to the growth and expansion of the company.

The Du Pont American industries and the advertising managers of the individual companies are: The Arlington Works, A. R. Kneale; Du Pont & Harrison Chemical Works, L. B. Steele; Du Pont Fabrikoid Co., A. H. Berwald; Du Pont Dye Works, S. F. Withe; Harrison & Bridgeport Paint Works, J. Coleman Bentley; Industrial Explosives, E. F. Carley; Agricultural Explosives, F. W. Wilson; Sporting Powders, Edmund Doremus.

The Canadian advertising of the Arlington Co., Ltd., and the Du Pont Fabrikoid Co., Ltd., both of Canada, is in charge of J. M. Cane. In addition to the above mentioned industries the company recently acquired a large interest in the General Motors Co. In view of the thoroughness with which the Du Pont Co. applies itself to any proposition, it is safe to predict that its venture into this field will have a marked influence on the future of the automobile business in this country.

Increase of Freight Rates On Auto Bodies

Members of the N. A. D. A. have been advised of the decision of the Interstate Commerce Commission, rendered July 14, which allows railroads to class automobile bodies over 36 inches in height as products which should carry four times first class freight rates of automobile bodies that are less than 36 inches in height. This decision was rendered in connection with a complaint entered last January by the National Automobile Chamber of Commerce.

This decision apparently will affect the form in which shipments of truck cabs and bodies are made by the shipper. Dealers should advise body factories to make shipments in conformity with the classification under 36 inches in height when possible in order to obtain the minimum freight rate.

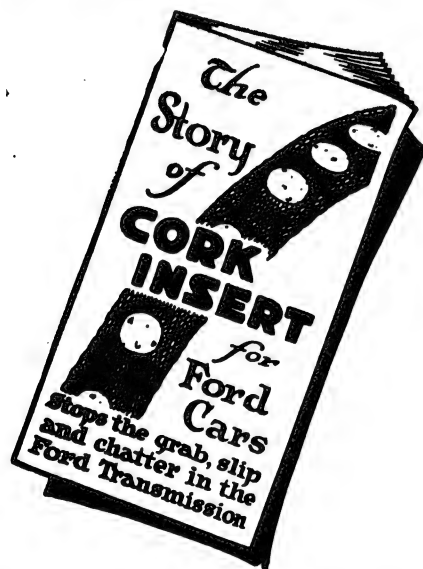
ALL SPACE FOR N. A. A. J. SHOW IN CHICAGO SUBSCRIBED.

At the meeting of the show committee of the National Association of Automobile Accessory Jobbers, at which the drawings for space for the forthcoming exposition to be held under the auspices of the organization, it was announced that all the space was substantially subscribed for on both floors of the Temple in Chicago, with the exception of about 20 spaces, and this allotment did not include a number of applications that the committee was advised were in the mails.

INSTRUCTIVE BOOKLET ON FORD TRANSMISSION ACTION.

A new booklet, just off the press, goes thoroughly into the question of transmission action of Fords. It tells how a smoother working Ford can be had simply by taking proper thought in the selection of transmission lining. The causes of the chattering and vibration which attends the transmission action in the Ford are analyzed, and the method of overcoming them clearly shown.

One of the features of the booklet, which is named "The Story of Cork Insert," is views of the factory where cork insert transmission lining is prepared. The big machines are shown which punch 24,000 sets of linings in an eight-hour working day. Also the rooms of



girls are pictured in the act of setting the corks into the linings. One girl can set 10,000 corks in a day.

Another department of interest is the pages which give the experiences of Ford owners in the use of cork insert. After reading of the long mileage secured and the smoothness and quietness of operation, it is not difficult to understand why cork insert transmission lining has come into such extensive use during its first year on the market.

A copy of the booklet, "The Story of Cork Insert," will be mailed to any one who will address request to Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago.

Alarming Theft Of Automobiles In St. Louis

Over 1095 Cars, Valued at \$3,000,000,
Stolen Since First of Year,
and 303 Not Recovered.

The police department of St. Louis, Mo., has added 28 men to its automobile squad, making 35 in all, who are devoting their entire time to suppress the alarming growth in the theft of cars. Since the first of the year 1095 cars were stolen, of which number 303 have never been recovered.

FIRESTONE STOCKHOLDERS GET EXTRA DIVIDEND.

The directors of the Firestone Tire and Rubber Co., Akron, O., have declared an extra dividend of \$1 per share on the common stock, payable to stockholders on Sept. 20. The notification of the dividend was sent to the stockholders in a circular signed by President H. S. Firestone, in which he made brief comment on the affairs of the company. The circular was as follows:

"At the meeting of the board of directors, held Dec. 15, 1917, the following resolution was adopted:

"Resolved, That it is the sense of the board that in the year 1918, if business shall develop as it now promises, dividends shall be paid on the common stock of the company, aggregating \$6 per share for the year.

"Commencing with the dividend of Dec. 20, 1917, the quarterly dividends have been at the rate of \$5 per share, per year. We are very glad to advise that our business justifies paying the additional \$1 per share dividend for this year, and the following resolution was passed by the board of directors today:

"Resolved, That for the quarter ending Aug. 31, 1918, a dividend of \$1.25 per share be declared upon the issued common capital stock of the company, payable Sept. 20, 1918, to stockholders of record Sept. 10, 1918, and

"Be it further Resolved, That a special dividend of \$1 per share be declared upon the issued common capital stock of the company, payable Sept. 20, 1918, to stockholders of record Sept. 10, 1918.

"Allowing for the restrictions on the importation of crude rubber and the production of pneumatic tires, we estimate our sales will approximate \$75,000,000 for the fiscal year. Our solid tire business has increased greatly, and we are diverting our plant and labor used in pneumatic tires to rubberized fabric, balloons, gas masks and other war essentials.

"Our profits for the year cannot be determined until after inventory, Oct. 31, but we feel safe in stating that after caring for dividends, taxes and liberal reserves, a very satisfactory amount will be carried to surplus account."

PATRIOTIC AUTOMOBILE RADIATOR SERVICE FLAG ORNAMENT.

Every one with a member of his family in the service has good cause to be proud of the fact and the display of a service emblem indicating the fact is also a service to the nation as well, as it maintains before the public the fact of the large number of young men who are serving their country, thus keeping the spirit of patriotism constantly enlivened. The service flag idea has been appropriately adapted for the motorist in the form of a handsome steel radiator emblem, as shown in the accompanying cut. It is finished in red and blue colors that will not fade or become dim, and is 2 1/3 x 5 3/4 inches. It is made of 28 gauge steel, has beveled edges and is complete and ready to attach.



Patriotic Automobile Radiator Service Flag Emblems, as they are called, sell at 50 cents each and the makers offer liberal discounts to dealers and jobbers, which will be given upon application. The makers are the L. & M. Service Specialty Co., 504 Sherman St., Chicago, Ill.

WEBBER CARBURETORS UNDER THOROUGH TEST IN NEW YORK.

The Webber Manufacturing Co., Boston, Mass., through its sales representatives in New York City, has been making some very thorough tests of the Webber carburetor on various makes of cars. Some of the big truck concerns of that city are demonstrating that the Webber carburetor lives up to the many claims its manufacturers are making for it, and the service that is being rendered at the factory branch, 1765 Broadway, which is in charge of Henry S. Jacques, is building up a reputation for the company.

Agents for the State of Ohio were recently appointed and the territory is being rapidly opened up on the demonstration of the carburetor. William S. De Ott, 1397 W. 37th St., Cleveland, O., is distributing the "Webber" in Northern Ohio, and the Eagle Auto Co., 424 South Main St., Dayton, O., is handling the Southern Ohio territory.



Tractor Has Wide Working Scope on Field and Road and Is Efficient On Grades



Top View Shows Acme Tractor Driven by Tracks Climbing 45-Degree Hill—Note the Wall Line of Buildings.

To the Left Is a Fitch Four-Drive Tractor Hauling a Road Grader, This Being a Work for Which the Machine Having Complete Traction Is Specially Suited.



Cultivating a White Mountain Farm with an International Tractor: At Left, Disc Harrowing a Big Field with a Two-Gang Equipment; at Right, Work Done by the Tractor Requires a Four-Horse Team. Note the Heavy Grade of the Hill.



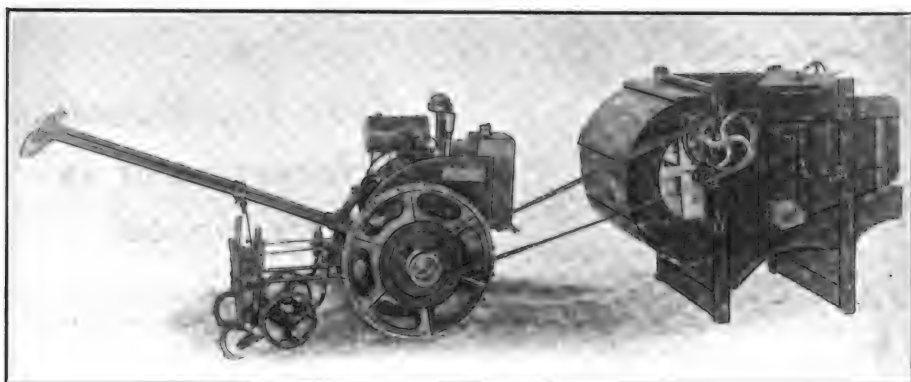
The Acme Tractor with Both Types of Drive: At Left, Wheel Driven, Hauling Gang of Plows; at Right, Discing in Soft Ground with Track Equipment.

Light Powered Tractors Can Be Used for Many Purposes On Large or Small Farms



Top View Shows Beeman Garden Tractor in Use with Cultivating Implement Attached. It Will Draw a Seven-Inch Plow or Other Light Cultivating Tools.

To the Right, the Beeman Tractor Is Shown with Small Wheel Attached for Use as Portable Power Plant.



Examples of Light Tractor Work: Upper Left, Whitney Unit Hauling a Two-Gang 14-Inch Bottom Plow; Upper Right, Driving a Feed Grinder; Lower Left, Drawing a Disc Harrow; Lower Right, Pulling a Threshing Machine in a Field.

Ralph De Palma Whitewashes the Field

Wins Every Event in International Sweepstakes at Sheepshead Bay and Establishes Several New Records—Averages Nearly 116 M. P. H. for Two Laps



Ralph De Palma, the Winner, Who Becomes World's Premier Racing Car Driver.

Ralph De Palma demonstrated the superiority of his Packard racing car and his skill as a pilot beyond the vistas of a doubt at Sheepshead Bay on Aug. 17, when he took all five heats of the International Sweepstakes and incidentally established several new track records.

The race was run in five heats of two miles, 10 miles, 20 miles, 30 miles and 50 miles respectively, each carrying six points to the credit of the winner, making a total of 30 for De Palma. Ralph Mulford, driving a Duesenberg, took second honors with 22 points, and Dario Resta third with 19 points. Arthur Duray, the Belgian race driver, received six points. Louis Chevrolet and Ira Vail both had bad luck throughout and failed to score.

The pace that De Palma set in each event was too much for his competitors. In the two-mile event he averaged better than 110 miles per hour, eclipsing the former record held by Resta by 7.25 seconds, and in the 10-mile event he covered in 5:23.80, which is just a second better than his own previous world's record of 5:24.80 made in Chicago, and at the date of 111 miles an hour. The last two miles of the heat were covered in 1:02.2, or at the rate of 115½ miles per hour. He made the 20-mile distance in 10:51.60, which time is over a second under the record, while in the 30-mile event his time was 16:31.20, or 2:24.9 better than the previous record set by Johnny Aitken at Indianapolis. He continued the record breaking pace in the 50-mile event, which he covered in 27:29.20, which was better by 45.43 seconds than the previous record made by Dario Resta on the same track last year.



Ralph Mulford, Who Gave the Leader a Close Race and Captured Second Money.

Lower Tax Based on Horsepower is Proposed

Ways and Means Committee Changes Plan for Levying Against Automobile Owners.

The Ways and Means Committee of Congress have abandoned their plan to place a flat arbitrary tax on automobiles based on the original cost price and will incorporate in the revenue bill a tax



Dario Resta, the 1916 Champion, Who Took Third Honors.

based on the horsepower of passenger cars and trucks. This will be levied as follows:

23 horsepower or less.....	\$10
24 to 30 horsepower.....	20
31 to 40 horsepower.....	30
More than 40 horsepower...	50

Under this tax the government will raise but \$70,000,000 as compared with \$100,000,000 under the first plan.

CALENDAR OF SHOWS AND RACES

UNIONTOWN, PA., SEPT. 2—Race, auspices Uniontown Speedway Association.

INDIANAPOLIS, IND., SEPT. 2-7—Automotive Show in conjunction with Indiana State Fair; auspices Indianapolis Automobile Trade Association; John Orman, Manager.

CHICAGO, ILL., SEPT. 7—Racing meet, Chicago Speedway.

OAKLAND, CAL., Sept. 9-OCT. 6—Pacific Coast Land and Industrial Exposition, Civic Auditorium.

CHICAGO, ILL., SEPT. 14-21—National Truck, Tractor and Accessory Show under the auspices of the Automotive and Accessories Exposition, Inc., Municipal Pier. H. V. Buelow, manager

NEW YORK, N. Y., SEPT. 21—Racing Meet, Sheepshead Bay, auspices Sheepshead Speedway Motor Club, Inc. (Sanction pending.)

MONTREAL, CAN., SEPT. 17-19—Farm Tractor Demonstration for Eastern Canada.

DETROIT, MICH., SEPT. 23-45—Convention, National Association of Purchasing Agents; Hotel Pontchartrain.

CINCINNATI, O., OCT. 6—Racing Meet.

DALLAS, TEX., OCT. 14-27—Seventh Annual Automobile Show; Texas State Fair.

OTTAWA, ONT., OCT. 16-18—International Plowing Match and Tractor and Farm Machinery Demonstration. Experimental Farm.

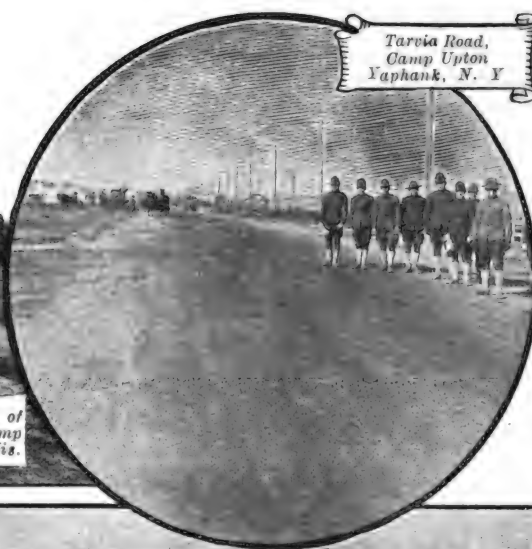
CHICAGO, ILL., Oct. 28-Nov. 2—Convention and Automotive Equipment Exhibit, National Association of Automobile Accessory Jobbers.

DES MOINES, IA., Dec. 2-5—Tractor Show in connection with Convention of the Iowa Implement Dealers' Association.

KANSAS CITY, MO., FEB. 10-15, 1919—National Tractor Show, auspices Kansas City Tractor Club; Guy E. Hall, Secretary.

Tarvia

Preserves Roads
Prevents Dust~



Tarvia Road at Camp Devens, Ayer, Mass



Tarvia Road at Camp Dix, Wrightstown, N. J.

Tarvia Roads in U. S. Camps—

THE Government has built sixteen new camp-cities or cantonments for housing and caring for the new armies.

A cantonment is a miniature city of 40,000 inhabitants with the heaviest kind of traffic on the avenues.

Constant lines of automobiles, auto-trucks, mule teams, horses, artillery, and thousands of marching men fill the arteries of traffic. The road problems have been intricate and varied and above all speed in construction has been paramount.

Old types of roads, the corduroy and the dirt road, were not adequate to the needs of these camps. *Good roads had to be supplied* in order to keep the tremendous camp-traffic moving.

Many miles of Tarvia roads were promptly built and are now giving entire satisfaction—

- First—because they are smooth, durable and waterproof.
- Second—because they are neither dusty nor muddy.
- Third—because they are quickly built, and are easy to maintain in good condition.
- Fourth—because they are the most economical under the circumstances.

The use of Tarvia in these camps is an illustration of the versatility of the material and the service rendered by The Barrett Company.

The Tarvia was ready and the expert advice that went with it was put freely at the service of the Government.

Whether a road-binder, a dust-layer, a road-pre-server, or a patching material was needed, there was a grade of Tarvia to fit.

Illustrated booklet free on request.

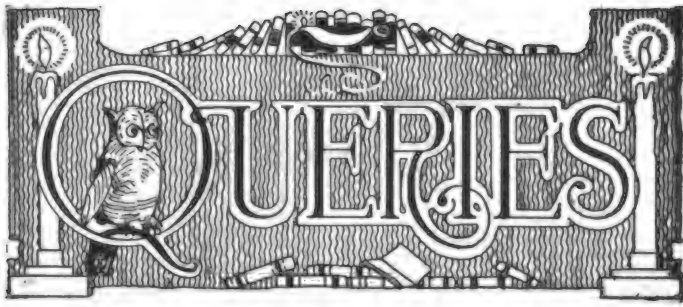
Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by any one interested.

If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will have prompt attention.

The Barrett Company

New York Chicago Philadelphia Boston St. Louis
Cleveland Cincinnati Pittsburgh Detroit Birmingham
Kansas City Minneapolis Nashville Salt Lake City Seattle
Peoria Atlanta Duluth Milwaukee Bangor Washington
Johnstown Lebanon Youngstown Toledo Columbus
Richmond Latrobe Bethlehem Elizabeth Buffalo Baltimore
THE BARRETT COMPANY, Limited Montreal
Winnipeg Vancouver St. John, N. B. Halifax, N. S. Toronto
Sydney, N. S.



NOTICE TO READERS.

THIS department contains the Mechanical Editor's answers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactorily, or if you desire information regarding operating, maintaining or repairing motor cars, do not hesitate to lay your troubles before him. He will answer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should always be signed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more widespread interchange of ideas. To this end the attention of readers is invited to the following question:

WHAT TIRE TOOLS AND TIRE REPAIR EQUIPMENT DO YOU CONSIDER ESSENTIAL FOR THE CAR AND WHAT IS THE BEST WAY TO USE THEM?

To the writer of the best answer to the above question \$2.50 will be paid. For the next best answer \$1 will be paid. The best answers received will be published in the September issue. Answers to the question should be in the hands of the editors by the 10th of September. The contest is open to every one.

HOW DO YOU CARE FOR THE STORAGE BATTERY AND KEEP IT IN GOOD WORKING CONDITION?

(R. S. Albertson, Benton, Pa.)

Best Letter.

There are several makes of storage batteries in use on motor cars today. With proper care they will perform their function perfectly.

The writer is acquainted with several men who expect too much from their batteries and consequently have had to replace them with new ones, or new parts at least, which expense and trouble could easily have been avoided.

The storage battery should be examined twice a month to ascertain the depth of liquid over each plate. Also the strength of each cell. The writer's experience with a three cell Willard battery has proven successful. The battery has been in use since Dec. 31, 1915, and has never had any repairs other than adding a little distilled water at different times and at the present time will test (each cell) 1.260. Before storage batteries were manufactured the car owners had no other way of starting the engine only by the use of the crank and thought nothing of it. If car owners would use the crank a little on frosty mornings instead of grinding the starting motor, the battery would be more efficient.

The depth of the liquid over the plates should be about three-quarters of an inch. If it is any deeper the liquid is liable to slop over through the three vent holes in the screw caps, which condition will cause the exterior of the battery to corrode.

If the liquid is allowed to evaporate until the plates become bare, they will warp, causing a short circuit, which will require a new set of plates, costing about \$10.

Distilled water can be obtained from any drug store or garage.

The writer places a large glass bowl on a box, up from

the ground and away from trees or buildings, where no foreign matter can get into the bowl and when there is a nice still rain a supply of pure water is secured.

After obtaining enough of the water I strain same through a clean cloth and pour it into a bottle and fill the neck of the bottle to the cork. Then it is placed where it is cool for future use.

The testing of the cells for their strength is ascertained by the hydrometer, which can be purchased anywhere for a small sum. Any one wishing to prolong the life of a battery must expect to tend to it regularly.

In starting the engine on a cold morning fill the radiator with warm water. Cover with robe or blanket and let stand a few minutes. Then instead of using the starter use the hand crank. Spin the engine a few times with the throttle opened to draw up the gasoline from the carburetor. Open the priming cups and with an oil can put in a small amount of gasoline. Close the priming cups, snap on the switch and generally the engine will start at the first turn, thus saving a large amount of current which would otherwise be drawn from the battery had the self starter been used.

After the engine is thoroughly warmed up the starting motor can be used without exhausting the battery so fast, as the engine will start more quickly.

Those who reside in the country are sometimes compelled to abandon the use of their car on account of deep snow, as such was the case last winter. In such cases I remove the battery from the car and place it in the cellar, where it does not freeze until road conditions are better.

There is more than one way to destroy the life of a battery. Some engines get their spark from the storage battery instead of the magneto. For instance, in running your car into the garage, if you should happen to stall the engine just after entering and should forget to turn off the switch. If the car remained that way all night possibly the battery would have to be recharged before the starter would turn over. Just as soon as the switch is turned on the ammeter hand will show a discharge.

Constant running of the car at night when the lights have to be used and not much running in the day time will eventually run the battery low. By using the crank a little when the weather is cold and examining the battery regularly twice a month, I think the most of us will find our battery working O K.

Second Best Letter.

(R. L. Prindle, N. Abington, Mass.)

Regular, intelligent care and inspection given the storage battery is time well spent, as it will forestall serious troubles which are sure to develop if one neglects this unit of the car's electrical system. The battery requires the same amount of care as any other part of the car, and if the small things are taken care of the bigger things cannot develop. A large number of cars and trucks today are equipped with a storage battery only and are dependent on a charging station to keep these charged. But in cars having a complete electrical system the generator feeds the battery, though there is a chance for the battery to go wrong even then. In every case it requires the same care.

In this age of conservation we must conserve the supply of every metal, particularly brass, copper, aluminum and steel. Some of these metals are used in spark plug shells and on many other places about the car, and with proper care these will not have to be replaced before their natural length of normal use.

The storage battery is a good example of this, as its make up consists largely of lead and sulphuric acid, which are war materials of a high value. The average life of a battery today is about 12 months. With care and consideration it could be lengthened to four or five years and perhaps six.

The best solution of this problem is to purchase a battery syringe and hydrometer combined of a non fragile kind. Those made of celluloid will outlast the others if one is careful and carries it in the car.

Once a week unscrew the caps and with the hydrometer draw some of the electrolyte when the hydrometer is floating freely and note the reading. In every case the solution should be returned to the cell it was taken from. Do the same with each cell. These readings are taken before the addition of

distilled water. In a fully charged battery the reading would be between 1.275 and 1.300. Never allow this to fall below 1.100, as this indicates a complete discharge.

Nothing but distilled water can be put into a battery unless one is an expert. Very often the reading is found to be low, and many persons are of the opinion that if acid was put in it would bring the electrolyte up to the proper strength. As a matter of fact this practise would prove fatal to the battery, because there is already plenty of acid there, but it is in the plates. When it is charged the acid is driven out into the electrolyte again, the solution becoming so strong as to ruin it by sulphation.

Lack of brilliance in the headlights, or becoming brighter when the engine is speeded up, or the starter not sufficiently strong to spin the engine as rapidly as before. Where these conditions hold the battery should be carefully looked over and the charging system also by an expert. Watch the ammeter, as this is the pulse of the electrical system.

There is less resistance set up to the passing of the current if all terminals and connections are tight, clean and not corroded by action of spilled acid. Prevent sulphation of terminals by first cleaning with a piece of waste dipped in ammonia, wiping dry and coating with vaseline or cup grease. This is very apt to take place particularly if brass and copper comes in contact with the lead binding posts. Electrolyte creeps up from the battery to the point of contact and attacks the lead, forming what is known as layers of lead sulphate between the binding post and the end of the wire, which will result in a case of insulphation, which means further delivery of current will stop. Care should be exercised to have contacts clean and set up with a wrench or pliers and are covered with cup grease. This is an effective means of preventing electrolyte from creeping into the crevices, as the terminals are sealed.

Avoid short circuits. Never lay anything across the top of the battery. A rapid discharge of current would take place, also sulphation, together with buckling of plates, and tend to break the separators. Another cause of short life is poor insulation of the wiring. Renew old or oil soaked wires and support others lacking proper fastening.

A leaky battery may mean a broken jar.

Spilled acid about the battery or battery box should always be wiped up with waste soaked in ammonia.

Clamp down securely with clamps provided for this purpose.

The generator will have to be kept in good order so as to give a steady flow of current to the battery.

The battery will never fail you if you give it a chance. Nothing ever happened without a cause.

WHAT GASKETING METHODS HAVE YOU FOUND BEST TO KEEP YOUR ENGINE TIGHT AND INSURE IT AGAINST OIL LEAKAGE?

(R. L. Prindle, N. Abington, Mass.)

Best Letter.

The proper maintenance of gaskets throughout the engine is highly important, as when any of these become broken or flattened they no longer serve their purpose, and as a result leakage in these places and engine efficiency is greatly impaired. There are two places about the engine that poor gasketing will cause missing and uneven running or stop the engine entirely. These being when the detachable head is fitted to the engine block and at the joints between the carburetor and manifold and at the point between manifold and engine. If any leaks are present at any of these places the mixture will be diluted to such an extent that the charge becomes unburnable.

To determine whether any leaks are present about the cylinder block, note where the block is marked by black, brown or rusty streaks. A new gasket well covered on both sides with shellac is the remedy which must be tightened before becoming dry. Gaskets for this purpose may be obtained from any automobile supply house, or with care, any one may make these from heavy wrapping paper. One should use a sharp knife, using the old gasket for a pattern. In replacing the detachable head great care should be used in setting up the studs uniformly, giving each a turn until all are tight, for if this is not done danger of warping is present, making a tight fit impossible.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

COES *The Standard WRENCH*



WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.

Economy tools as they last longer, give better service and never become useless through wear.

Utility wrenches of the highest order for car owners and repairers as they can be used in compact places and once set hold like a vise.

*The Best Wrench
The Cheapest*

All dealers carry in stock the exact size to meet your need. They recommend Coes Wrenches as all good dealers have for more than fifty years.

COES WRENCH COMPANY
WORCESTER, MASS.

The **AUTOMOBILE JOURNAL**

Is the oldest Automobile magazine published in America devoted wholly to the owners of passenger cars.

A quality magazine with prestige and circulation that brings results to advertisers.

**TIMES BUILDING
PAWTUCKET, R. I.**

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August, 1918.

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BATTERY.

(Wm. G. Reed, Boston, Mass.)

Carefully read, study and obey the instructions found in the booklets issued by the manufacturers of your particular battery.

They include:

Inspections, once or twice a month. Better once a week; and if the car is used a great deal, every 200 or 300 miles.

Never put any but pure, distilled water in the solution.

There is very little, if any, danger of overcharging, but there is of overheating. Do not try to force an unwilling engine to go to work. If it is "balky" look for something wrong in gasoline feed or electric system.

The generator is nicely calculated to care for the lights, with a surplus for "recharging." What the lights would consume, together with that "surplus," is too powerful a current, if long continued on a hot day. At this season, when touring, one is often tempted to "hit her up" to 25 or 30 miles per hour. At such times turn on the lights. Same if in "second" or "first" on bad roads or long, steep grades. The motor speed is the real factor.

FORD MAIN BEARINGS.

(G. C., New York City, N. Y.)

Kindly state a way that I can repair one of the main bearings of my Ford car without removing the engine block from the chassis. The babbitt seems to be all right, but there is a little play in the bearing, enough to cause a knock. There are no shims between the cap and the bearing.

The main bearings on the Ford engine are poured into place and cannot be replaced without removing the whole block and sending it to a repair shop or service station. Whether a repair is possible or not depends upon the amount of babbitt metal left in the bearing. Remove the cap and place it in a vise. Then with a medium file scrape off a very small portion of the cap face, taking care to keep the face flat and even or the cap will not fit properly. After a little of the face has been removed try the cap into place and see if it can be tightened to take up the play in the bearing. After

The Accessory and Garage Journal

\$2 the Year, 20 Cents the Single Copy.

The only American publication devoted exclusively to the Power Vehicle and Allied Industries and Trades. A guaranteed circulation of 25,000 copies to trade interests only.

Address all communications to the

TIMES BUILDING

Pawtucket

Rhode Island

DIXON'S
GRAPHITE
Automobile
LUBRICANTS

cut down expense and time lost by repairs.
They coat moving surfaces with a lasting oily
veneer that saves wear. Booklet No. 210 G.

Made in Jersey City, N. J. by the

JOSEPH DIXON CRUCIBLE COMPANY
Established 1827



\$2.00 THE YEAR

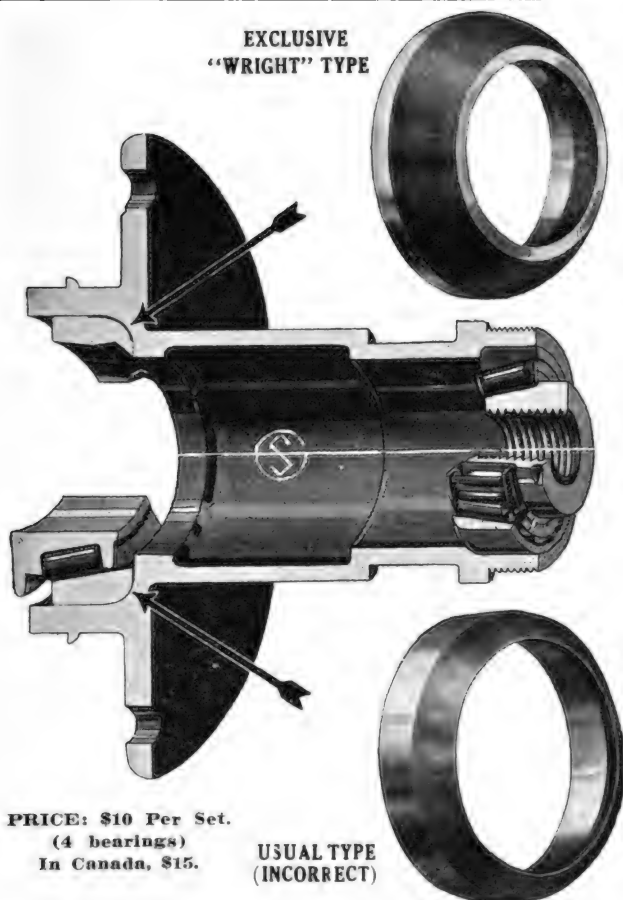
The Accessory and Garage Journal

The National Trade Authority

TIMES BUILDING, PAWTUCKET, R. I.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

EXCLUSIVE
"WRIGHT" TYPE



PRICE: \$10 Per Set.
(4 bearings)
In Canada, \$15.

USUAL TYPE
(INCORRECT)

The Only Scientifically Correct Roller Bearings for Fords

After continued tests in actual service a common fault in all taper roller bearings for Fords was discovered. The inner ring, being subjected to a continuous twisting strain, has a tendency to move out of position and thus ruin the bearing. Inability to provide a proper seat for the bearing is the primary cause of this trouble. With this fault in mind the Wright Bearing was improved by the addition of a second surface (see cut). This second surface being at right angles to the other holds the bearing firmly in place and makes it absolutely impossible to move.

A glance at the cuts will show the firm manner in which the Wright ring is seated in the hub and a comparison of the Wright ring (at top) with a general type of ring (at bottom) will show the radical difference in construction.

The fundamentally correct design of the Wright Bearing makes this feature (on which patents are pending) possible to the Wright type alone. No other bearing can have it without changing the entire design of the bearing itself.

Thus the Wright Bearing, which embodies the correct fundamental principles of bearing design, has added another exclusive feature to an already proven superior product.

Ask your dealer or jobber to show them to you

NATIONAL BEARINGS SERVICE CO.

WRIGHT TAPER ROLLER BEARINGS

Replacements for all Standard types of Bearings

1410 Girard Ave., Philadelphia.

16 West 62nd St., New York.

Wright Bearings are an Essential to Truck Units Using Fords or Chevrolets.

the cap has been filed enough so that it can be tightened enough to come up against the shaft, cover the journal with Prussian blue and scrape the babbitt if necessary until a good bearing surface is obtained. Be very careful in scraping not to remove too much of the metal or you will be unable to fit the bearing properly.

If the babbitt is very thin or badly worn the best plan will be to send the block with the crankshaft and bearings complete to a Ford service station and have all the main bearings replaced, for if one is worn the other two will probably need replacing in a short time.

PROPELLER SHAFT TROUBLE.

(A. A. F., East Orange, N. J.)

As a reader of the Automobile Journal I write to ask for some of the helpful advice which I know that you are giving to subscribers.

I have a Buick D 6-45 (1916). When I grasp the propeller shaft just behind the universal joint I find that I can revolve it back and forth, for perhaps a quarter of an inch or a trifle more. I presume that this play should be taken up. It is not clear to me just how this is done and whether it is a particularly difficult job to do, requiring an experienced man.

Will you please write me in detail regarding this. I have run the car 11,000 miles without having made this adjustment and I guess it's time to have it done. I expect to go on a tour in about three weeks and would appreciate early advice.

We suggest that you remove the drive shaft from the car, clean and make thorough adjustments as follows:

Loosen the cross pinch bolt at the rear of the torque tube. Remove pinion adjustment corner plate and expose the pinion adjustment. Mark with a file the exact point the drive shaft projects from the torque tube. Turn the pinion adjustment to the right until it is free, whereupon it may be drawn out at the rear.

Wash all parts thoroughly with gasoline, making sure that the gasoline is absolutely free from sediment and carefully examine all parts for wear.

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Replace the drive shaft and screw the pinion adjustment back until the file mark on the drive shaft shows itself in its former position. The pinion adjustment is then the same as before. Replace the differential and bolt it into place. Any loose play in the driving yoke can then be removed by loosening the clamp screw at the end of the torque tube and turning up the nut until all end play is eliminated, whereupon the clamp screw is tightened and adjustments are complete.

KNOCK IN FORD CAR.

(E. G., N. Chelmsford, Mass.)

Will you kindly tell me what I can do to stop a knock in my engine. I put in all new piston rings, the top rings are leakless. Since their installation there is a knock in the engine. My car is a Ford. The connecting rod bearings are tight and the main bearings are O K. The knock seems to be in the front cylinder.

This condition may be due to any number of different troubles and to locate these a search much be made in a systematic manner.

Knocking in the Ford engine is usually traced to Carbon deposits on the piston heads.

Loose connecting rod bearings.

Loose crankshaft bearings.

The spark advanced too far.

The engine overheated.

Insufficient lubrication.

There are quite a number of possibilities for this condition in your car. First examine the gasket between cylinder head and block. We should advise a new one, covered with a paste of graphite and oil. Under ordinary conditions the leakage may not be noticeable, but high engine speeds or under pressure there may be a leakage of water into the cylinders. If the leak is large it would account for the knock.

Examine the valve setting carefully. Be sure that the clearance between the tappets or push rod is not more than 1/32 of an inch. The correct clearance should be about 3/32 of an inch when the engine is cold.

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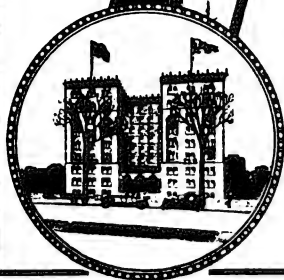
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H. GARDNER, Mgr.

Recently we were called upon to inspect a Ford which developed a peculiar knock and we found that the spark plug electrodes extended into the valve chamber so far as to interfere with the valves. In this case the engine action was very peculiar. Besides the knock there would sometimes be a skip, sometimes a backfire, due doubtless to the fact that the intake wedge opened. There was a noticeable lack of power. Inspect your engine for the same conditions.

Inspect the valve setting. See that the exhaust valve closes when the piston in that cylinder is at top centre. Check over the timing. It may be possible that the timing rod has been sprung or bent so as to retard the timer. With the spark fully retarded the coil should begin to buzz 1/16 of an inch from the top center.

Are you sure that the piston rings are tight? Is the compression good and the cylinders not scored?

If you are using any kind of water attachment on the carburetor, inspect it to be sure that it is not delivering too much water to the cylinders.

RENOVATING MOHAIR TOP.

(J. W. Mc., New York City.)

What is the proper treatment and best material for renovating a mohair auto top?

A mohair top should frequently be dusted and brushed. Mohair is not effected by climatic conditions and will withstand both heat and cold, and not having oil in its makeup does not pick up nor hold dust readily. The top can be lightly beaten with a carpet beater and what dust rises from inside the fabric can easily be brushed off with a whisk broom. In cleaning a mohair top do not use an acid solution. Grease or oil may be removed by the application of a solution of luke warm water and ivory soap applied with a woolen cloth. Any of the approved methods of cleaning cloth may be used to advantage upon this material. Gasoline or benzine have a tendency to spread instead of remove the dirt and for this reason is not to be recommended, although it works no apparent injury to the material.

For making quick and permanent repairs of holes and torn sections in the top, we suggest a self curing patch, which is sold in various shapes for 50 cents a box. These patches are a fine quality of mohair with a coating of uncurling gum on the under side. To use simply moisten the gum side of the patch, cover the hole and press firmly until the gum sets. This will make a neat and unnoticeable repair. The patches may be purchased at any accessory store.

Do not fold a top until it is thoroughly dry. Any moisture remaining in the folds is apt to cause mildew, besides making the top leaky and unsightly with spots. If the car is not to be used for some time it is best to open the top, thus keeping it well stretched and smooth.

KNOCK IN OLDSMOBILE ENGINE.

(A. L. H., Rochester, N. Y.)

Being confronted with queer engine troubles I have decided to write and explain them to you as perhaps you can offer some suggestions that would help.

I have an Oldsmobile model 43, 1916. Last fall we had trouble that could not be located. The engine would run sluggishly. Had the carburetor cleaned and overhauled and adjusted for both lean and rich mixtures. Wiring all gone over, but found no ignition nor carburetor trouble. Still the engine ran unevenly. I was told to have the engine overhauled, so had the valves ground; took up on the connecting rods; installed leak proof piston rings, one ring to each piston, and purchased a new storage battery, which at last seemed to remedy the skip trouble. This was done last November. Now I am troubled with a knock which seems to occur in each cylinder when I try to accelerate or in taking a grade in high gear. If I race the engine when the car is standing the knock seems to turn into a thump. After consulting a garage man he claimed that the connecting rods were loose and I instructed him to take them up again, but in so doing the trouble has not been overcome. This being twice that the rods have been tightened since November and

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I have driven not over 1000 miles. It seems to me that there is something wrong that should be attended to. It seems impossible to get anyone that understands the trouble.

To state exactly where the knock is on your engine is practically impossible without first seeing your car and the best we can do for you is to give you a general synopsis of causes of engine knocks and allow you to work from these instructions.

It is necessary first to learn at just what part of the engine the knock exists and just what the cause is likely to be. With this information to start from no parts need be removed other than those absolutely necessary. Taking down an engine is a costly operation and often much time could be saved if it were known just where the trouble occurs. A sounding rod of iron or steel will be invaluable to locate the knock and with it one usually gets to the seat of the trouble at once. After determining just where the knock is situated the trouble may be easily overcome.

Before you start to make tests upon the engine be sure that the knock is not due to minor causes such as:

That cylinders are filled with carbon and that the knock is caused by preignition.

That the knock is due to running with the spark too far advanced.

That the carburetor is not properly adjusted.

That the valve clearance is not correct.

Knocks are usually caused from: Connecting rod bearings, wrist pins, main crankshaft bearings, loose pistons, timing gears, camshaft, loose flywheel, worn valve stems or pistons striking some projecting point.

ADJUSTING CARBURETOR ON KING EIGHT.

(C. R. M., Providence, R. I.)

My King "8" car, 1917 model, is using too much gas. It has a Ball and Ball duplex carburetor. Would you please let me know just how to adjust it to best advantage.

I want to congratulate the Automobile Journal Publishing Co. for the journals they have put out in June and July. If one is mechanically inclined he cannot help but take his car apart and put it together again without any difficulty.

There are only two adjustments provided and found necessary on this style carburetor. These are made by means of covers which control the tension on the idling valve springs.

After the engine is warmed up and running from 400 to 500 revolutions, disconnect the wires from the spark plugs on one group of cylinders, and screw the cover controlling the air of opposite live group of cylinders up or down until this side of the engine idles properly. This being done, disconnect the wires from the spark plugs of these cylinders and connect the wires to the spark plugs of opposite group of cylinders, which can be made to also idle properly by the same adjustment.

When connecting all the wires to their respective plugs reduce the throttle openings and cut the speed as low as possible. The idling valves will need some further slight adjustment owing to eight cylinders now turning the flywheel, but against screwing each adjusting cover a notch or two to the lower position should usually suffice to produce the desired results on the entire unit.

The proper mixture for the various other speeds will be furnished automatically and can be changed only by changing the size of the nozzle.

WHAT TO DO IN CASE OF FIRE.

(G. H., Boston, Mass.)

Having seen several automobile fires lately, I have wondered what I should do in such a case. Could you advise me how to be prepared for such an emergency?

If one keeps their engine well cleaned and free from grease and oil a fire will not often occur, but unfortunately a fire starts when least expected and it is well to be prepared for such a condition.

The most important thing to remember is to keep your head. A few seconds lost in dashing wildly about thinking

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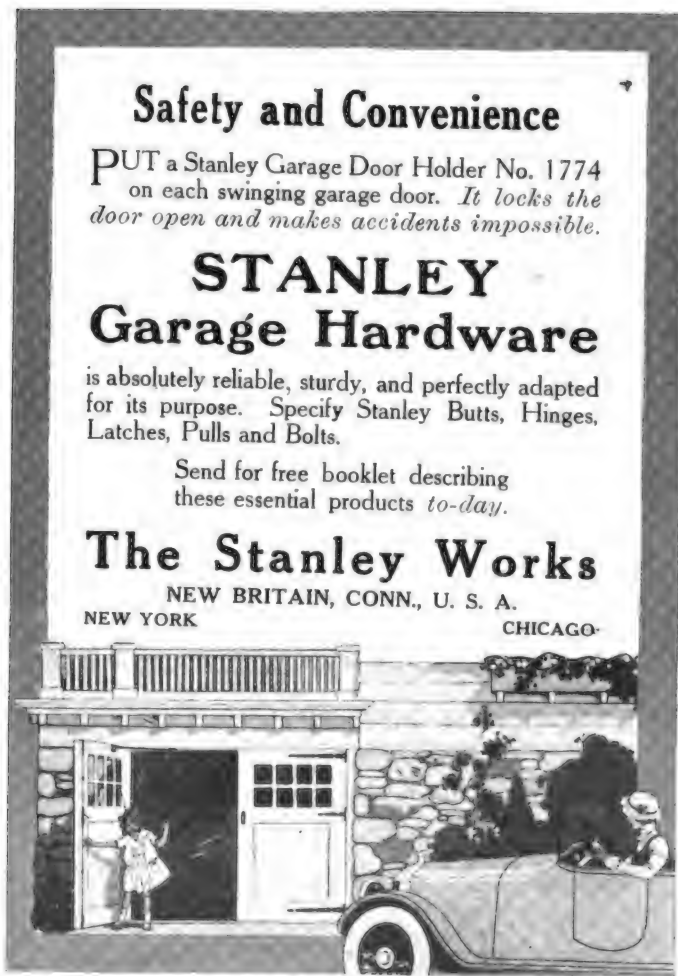
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what should be done and not doing it often results disastrously.

It is good policy to carry one small fire extinguisher in an accessible place about the car and an extinguisher of this sort is indispensable in handling a gasoline fire and in addition is always useful in fighting any other small blaze about the car. Should no extinguisher be at hand, either sand or dirt can be used, first remembering that if thrown into the carburetor mechanism much harm is liable to result. Water should not be used to extinguish a gasoline fire, as it will only tend to spread the blaze.

An extinguisher of which there are numerous types on the market is the best preventive for a fire and we strongly advise one as part of the accessories carried upon the car.

RIGHT TIRE WEARS FASTEST.

(G. F. C., New York City, N. Y.)

Please explain to me why the right tire seems to wear much faster than the others? I cannot understand this, as both of my car's brakes are equalized, nor does the right rear wheel wobble or run out of true.

Since the power and traction come from the rear wheels, the rear tires, of course, get the hardest wear. When one is driving on the right side of the road and the roads are nearly always crowned nowadays—the car is tilted slightly; more weight being on that side. Therefore, the rear right tire takes hold the hardest and bears the brunt of the traction much more than the left rear tire. When the car is in motion the left tire rolls easily along in the smooth middle portion of the road, while the right tire gets the rough going, continually running off the sharp edge of the asphalt into rocks and ruts and is much more likely to encounter objects thrown to the side of the road. Then also the rear right tire takes the brunt of the stopping, sometimes sliding, thus explaining why most of the wear falls upon the right rear tire.

The tire receiving the next hardest usage is the left rear, then the right front and lastly the left front. When the right rear begins to show wear it is best to put it on the left front wheel, changing about as often as necessary, but first being sure that the tire runs in the same direction as formerly, not reversing the movement.

STARTING TROUBLE.

(C. R. C., Chicago, Ill.)

I own a 1915 model car that requires priming to start the engine if it has been standing overnight, and then stops after running a short time. The engine must be run until it is hot before it will take the load. The battery has been recently charged and it only lasted 10 days when it was completely discharged. Kindly advise me what the trouble is.

From the description that you give it would seem that the valves are not feeding properly and that the compression is not what it should be. This defect should be tested by turning the engine over with the hand crank and noting that the compression is equally good in each cylinder. Probably the valves need grinding or perhaps the piston rings are not tight and need replacing. In this case a leak proof ring should be installed in each cylinder. That your battery is run down denotes a short circuit or that you have left the switch on over night, in which case the starter is driving the engine. This type starter is a motor generator in which there is a constant connection between the starting motor and the engine and when running at very low speeds or when the motor is shut off with the switch on, the starting motor drives the engine and runs the battery. The wiring of your car should be carefully gone over for defects and worn places in the insulation.

SIMMS MAGNETO ADJUSTMENT.

(F. F. B., Providence, R. I.)

Please give me the proper adjustment for the platinum points in the Simm's magneto breaker box?

The platinum points should be set so as to open on each can about 1/64 of an inch, or the thickness of a business card. These points should be kept clean and made flush or flat with one another. If the points are separated on one side of the revolution more than the other, it is an indication that the contact breaker cam ring is worn and must be replaced by a new one.

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VOL LXVI.

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NO. 2.



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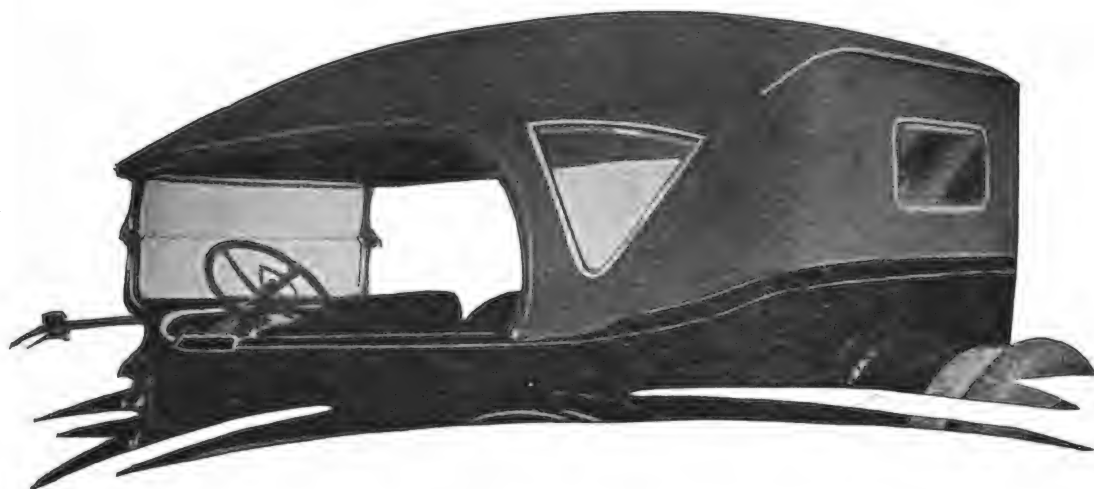
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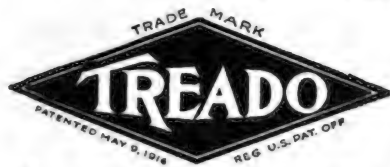
MANUFACTURERS AND GARAGES. With our facilities we are especially equipped to handle large and small **Welding Jobs.**

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Save Money On Your Tires

Here is a composition that not only makes an old, worn tire new, but actually prolongs the wear of your tire

TREADO

adds thousands of miles to tires, it rebuilds worn treads, mends large and small cuts and can be applied by any one. TREADO is a prepared rubber. Requires no cement, heat, patches or rubber.

Full directions on every can. Send today for a can at 50c.

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The World's Largest New and Used Parts House. St. Louis, 2823-25 Locust St.; Kansas City, 1701 Main St.; Cincinnati, 314 E. Third St. Write to nearest office.

Parts for any Automobile at a saving of 50% to 80%. Our three great plants cover every state in the Union, and we are therefore in better position to fill your orders.

Engines—40 to 50 of them on the floor now and we will make prices on them that will move them. Several unit power plants.

Transmissions—Planetary, two-speed, three-speed, four-speed, center control, with and without multiple disc clutch; all at surprisingly low prices

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We have in stock at all times parts for almost every make of car. **MAGNETOS, CARBURETORS, WINDSHIELDS, REAR ENDS, TRANSMISSIONS, GEARS, ETC.**

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BOULEVARD MOTOR CO.

Phone Cambridge 1621
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Real Bargains With Puritan Quality For The Motorist

Piston Ring Special Prices

We have rings of every size for any car.

High-grade rings up to 5 inches, in dozen lots at, each.....25c.

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New Made-to-Order One-Man Tops
We make the low, graceful one-man top to fit any car. It can be easily put in place, as it fits the old top fittings.

5-passenger one-man Mohair top.....\$45.00

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Roadster one-man Mohair top.....27.50

Ford Touring one-man Mohair top.....35.00

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These prices include the complete top, storm curtains, top dust-proof boot with special attachment for connecting top to any windshield.

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Complete set of two front and two rear absorbers with fittings ready to attach—for immediate delivery.

For Packard, Cadillac "8," Hudson Super-six and Haynes 1917 models, per set.....\$25.00

We can make fittings for many other cars and make delivery in 10 days. It is necessary for us to have the model type and the rear, as well as the name of the car, in order to insure a perfect fit, per set.....\$25.00

Extra Values in Casings and Tubes

These casings are factory seconds that will give excellent service. They do not have a mileage guarantee. Both the casings and the tubes are good values and will go fast—better order early.

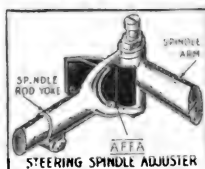
Casings		
30x3	Smooth tread	\$10.00
32x2½	Non-Skid	14.95
31x4	Non-Skid	20.00
33x4	Non-Skid	21.70
34x4	Non-Skid	21.95
30x3½	Non-Skid, Ford size	14.50

Tubes		
30x3	Heavy grey tubes	\$2.50
32x3½	Heavy grey tubes	3.85
31x4	Heavy grey tubes	4.65
33x4	Heavy grey tubes	4.90
34x4	Heavy grey tubes	5.15
30x3½	Red or grey tubes	3.00

PURITAN MACHINE COMPANY
108 Puritan Bldg., 415 Lafayette Blvd., Detroit, Michigan

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Trade Mark



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They serve many other useful purposes and are inexpensive.

JOBBER, DEALERS, write for prices and folder which mean money for you.

Price 50 cents per set

Affa Specialty Co., 34-D Southbridge St., Worcester, Mass.

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They stop the rattle in:—

The Brake Rod Supports

The Brake Rod Clevises

The Spark and Throttle Rods

The Steering Spindles

TODAY'S TIRE PRICES Will Be Unknown Bargains Soon

The present war time conditions have given us a bigger opportunity than ever to show you what our methods accomplish in giving you quality in tires at a reasonable price. The economies we effect through buying direct from the factories (not from middlemen or jobbers), and our special methods of selling direct to the consumer, mean more to you now than during normal times. We save YOU more because WE are saving more. In the entire history of our business we have never been able to give such big value for the price as we are offering you.

Goodrich, Fisk, U. S., Hood, Diamond, McGraw, etc.

Size	Price	Tubes	Size	Price	Tubes
30x3	\$9.00	\$2.30	34x4	\$18.35	\$3.65
30x3½	11.25	2.65	34x4½	23.25	4.45
31x3½	11.30	2.80	35x4½	24.00	4.55
32x3½	12.75	2.85	36x4½	24.50	4.80
34x3½	14.00	3.10	37x4½	25.00	5.00
31x4	17.00	3.35	35x5	27.25	5.60
32x4	17.20	3.45	37x5	28.75	6.00
33x4	18.00	3.50			

Non-Skids 10 Per Cent. Higher.

Mail Orders are accurately attended to. All C. O. D. Orders shipped with privilege of examination. If not satisfactory to be returned at our expense.

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We have in stock at all times parts for Stearns, Stevens-Duryea, Flanders, Maxwells, E. M. F. Buicks, Mitchells, Speedwells, Herreshoffs, Hudsons, Elmore's, Pope Hartfords and Franklin cars. Write, Wire or Phone.

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Safe—Because It Can Be Tested

—and that makes it a big seller.

You can sell Norwesco "TWELVE-TWENTY" in the full confidence that it represents the last word in non-freeze solutions. It is absolutely *safe* and *sure*—prevents frozen radiators to 20° below zero.

And the motorist *can test it* with an ordinary battery hydrometer—can *prove* that his radiator *is safe* from freezing. That means confidence in

NORWESCO
TWELVE-TWENTY
 PREVENTS FROZEN RADIATORS

And it means big sales for *you*.

"TWELVE-TWENTY" has none of the drawbacks of so many anti-freezing solutions. Does not "find" leaks. No complaints about evaporation—has a boiling point 12° higher than water. No mixing—no dissolving—pour it right out of the can into the radiator.

Such a non-freeze sells itself. And because the motorist can *test it* there are never any comebacks.

If you are already handling "TWELVE-TWENTY," send us your name and address and your jobber's name so that all mail

order inquiries can be forwarded to you.

If you are not yet carrying it, write to-day for our Dealer's Proposition. Be sure to give your jobber's name.

The Northwestern Chemical Co.
 709 State Street MARIETTA, OHIO, U. S. A.

Remember: "TWELVE-TWENTY" is backed by a great advertising drive in the Saturday Evening Post.



(When Writing to Advertisers, Please Mention The Automobile Journal.)

Urge Greater Care In Using Tires To Meet Needs of Conservation

**Manufacturers State That Thousands of Shoes Are Thrown Away
Prematurely That Should Run Out Their Full Mileage
If Given Proper Attention and Treatment**

THERE has been a moderate cut in the production of pneumatic tires for passenger car use and while there has been no request from the War Industries Board for restriction in their use, the large tire manufacturers are urging users to employ the various precautions that prolong the life of tires.

It is felt that this attitude on the part

constant supply and was willing to pay out the extra money rather than exercise due caution in caring for his tires and in handling his car in a manner that would prolong their service. Such an attitude, however, is no longer patriotic, as every car user owes to his country, his fellow motorist and himself to see that he derives every possible mile from

tire repair man or should receive the owner's prompt attention. There are a large number of people who neither have the time nor knowledge to enable them to care for their own tires, in which case they should seek the repairman, but there is almost every facility on the market to repair tires that can be secured by any one, a condition which permits of

GOING, GOING, GONE!

Story of the Neglected Tire Injury In Three Reels

Slight Tread Cut. Owner Thinks It Too Small for Attention of Repair Shop. Dirt, Water and Oil Get In, Starting Rapid Disintegration. Application of Tire Dough or Vulcanizer at This Stage Would Have Saved Casing and Tube.



Same Tire After a Run of 300 Miles, Showing Formation of Sand Pocket, Which Is Enlarging Rapidly. Structural Strength of Casing Weakened by Rotting Fabric. Not Too Late to Apply First Aid.



Too Late Now for First Aid. Several Hundred Miles Further Has Developed a Blowout and If Casing and Tube Are Not Ruined, Expensive Repair and Loss of Time Results.



of every user of pneumatic tires will effect a saving of millions of dollars and of crude rubber that now goes into shoes and tubes that reach the junk man long before they have run their allotted mileage and given the length of service for which they are designed.

Practically every motorist is familiar with the numerous ways in which his tires and tubes are prematurely consumed, but in the past he has had no reason to worry, as he felt assured of a

his shoes and tubes. This forehanded action will go a long way toward precluding any action that might possibly lead the government to require some conservation movement in the use of tires.

The most essential thing to keep in mind in this movement is the imperative necessity of giving immediate attention to any cuts, tears, bruises or perforations in the casings. Tires so injured should be immediately taken to a

no excuse for neglect or unwarranted wastage of this product.

Probably the most flagrant misuse of tires and the one responsible for the greatest wastage is the careless method of driving cars employed by such a large majority of operators. The average driver does not realize that when his car is rolling along at 20 to 30 miles an hour that he has from a ton to two tons of dead weight in motion and the enormous amount of friction necessary to

bring it to a stop. He applies the brakes and knows that the pressure is exerted against the brake drums, but never recognizes the fact that the actual friction which brought the car to a slower pace or to a dead stop was generated between the tire tread and road. The abrasive effect of the average road surface is equal to that almost of coarse sand paper and as an illustration of its effect one would have to drag a tire supporting a weight of over a ton across an abrasive surface, the former and latter being in relatively fixed positions.

Use of Judgment in Driving Will Save Many Tire Bills.

There is but one remedy for this chief cause of tire destruction and that is the employment of judgment in controlling the car. If the operator, instead of continuing to within a few feet of his stopping point at a high speed and then suddenly applying the brakes, would shut off his power at a proper distance from the stopping point so that the car would be brought to a standstill through exhausting its momentum, there would be little if any abrasive action exerted on his tires through friction between the tread and road surface.

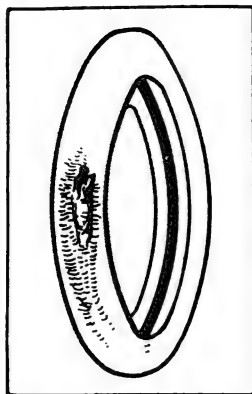
Many car owners are acquainted with these facts, but in the past when they were called to their attention they usually rejoined that life was too short for such extraordinary care and that they could afford new tires when necessary. This spirit, however, will not do under existing conditions and is no more excusable in a man who can afford new tires every day if desired than in the man who is doing it out of ignorance.

That the wheels of a car are in perfect alignment is another important feature in considering tire conservation, as wobbly wheels are a source of almost as great tire destruction as the careless driver. The prevalence of this type of neglect is alarming if one will take the time to post himself at a crossing where numerous cars pass, as he will be astounded at the number of machines running on wheels that wobble along from side to side, giving the same destructive action on the treads that would be secured by constantly drawing a piece of sandpaper across them from side to side with a pressure equal to that which could be exerted by 10 men. In calling attention to this deplorable neglect the Goodyear Tire and Rubber Co. in one of its conservation bulletins states that a tire is built to roll forward in a straight line—not sideways in a twisting motion, and that a tire running on a wheel that is out of alignment cannot possibly give good service. Frequently the mileage is cut down one half because the tread is ground away long before the casing has delivered its full quota of mileage, and, of course, the extent of the loss of mileage depends directly on the degree of misalignment.

Wobbly Wheels a Frequent Cause of Rapid Tread Wear.

As the driver never sees his wheels while they are running, he is not aware of their condition unless some one tells him about it and he immediately de-

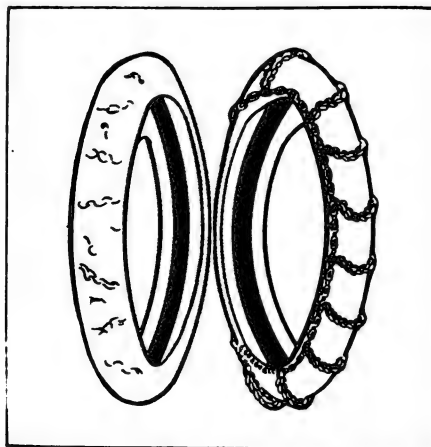
cides that his tires are of a poor quality when he discovers that the treads show abnormally rapid wear. There is only one sure way of avoiding this loss in tire service and that is to have the wheels measured frequently to see if the



Showing Long, Deep Laceration, the Ruinous Effect of "Heavy" Braking on Tread.

alignment is correct as many minor causes are responsible at times for throwing them out and a demountable rim placed crookedly will also cause excessive wear on the tire tread.

Before considering the wear on shoes and tubes from actual service there is another important point in tire conservation that is neglected by the average car operator, namely, the improper use of chains. Non-skid chains are used by most everybody in wet weather and when the roads are slippery or covered with sleet and snow and while they are the only known contrivance that has so far been brought out which actually serves to give the wheels positive traction under such conditions, they inflict



At Left: Chain Cut Tire Caused by Tight Chains. At Right: Properly Hung Chains.

considerable injury to the treads when running over hard pavements or hard roads. They are designed for use on soft, muddy or slushy roads, where it is difficult to obtain traction and where the chain sections sink into the surface of the highway and do not sink into the tire tread as they do on very hard surfaced roads.

As it is a bother, however, to constantly keep changing the chains the user should take care in applying them

so that they will have enough play to work around the wheel, which arrangement prevents the individual links from keeping a fixed position and gradually working into and cutting holes in the tire. In the winter time one can frequently see tires which have been cut clear to the tread wherever the chains cross the tread, a wanton and useless waste that has resulted from the negligence of the driver to apply the chains properly or remove them whenever their use is no longer required.

Chains Should Never Be Anchored or Put on Tightly.

Chains should never be "anchored" or held in fixed positions by tying them to the spokes or rim, but should be allowed to "float" as the wheel revolves and as when applied in the former manner they wear the treads when the car is being run over a hard surface, their use should be confined to road conditions calling for means of preventing the car's tendency to skid and to obtain traction. Should owners find that their chains have cut into the treads or that they have raised bruises, the tires should be immediately removed and repaired before the damage has extended to a point where the casing is not even fit for re-treading.

In changing tires and replacing them, aside from the precaution of properly placing the tube in the casing and getting the valve straight so that it will not work or tear the tube, it should be remembered that once tires have been run a few hundred miles they have acquired a "sense of direction," or the condition might be described as a "direction of flow." This results from the fact that after a tire has been on a wheel for some time it is affected by the direction in which it has been run, and being constructed of highly flexible and elastic material, it shapes itself to run in one direction, as the pressure on its fabric, strips and tread is exerted in one direction; it stretches in that direction; strains in that direction; recedes before a blow in that direction and while it recovers its normal shape to all outward appearances, it has a tendency to set in the direction where forced and does so to a certain extent. For this reason when it is removed it should be marked with an arrow indicating the direction in which it has been run and should be replaced so that it will turn as before.

This fact is probably known by but few motorists with the result that the majority in replacing their tires put them back on so that they reverse their original direction with the result that very rapid wear follows, as the same effect upon the structural strength of the casing is obtained as if the casing were put on a stationary mandrel and kneaded with a roller in alternate directions until the tread loosened from the fabric.

Transposing the Tires from Rear to Front Lengthens Service.

It has become a common practise among motorists to transpose the rear tires to the front wheels as a means of getting greater service. The greatest burden and strain is borne by the rear

tires and they wear much more rapidly and after they have been repaired several times it is good policy to place them on the front wheels and put new ones on the back. In making this transposition it should also be remembered that a rear right tire should be placed on the left front wheel and the rear left shoe on the right front, as in this change the sides of the tires that were formerly on the outside and exposed to the greatest wear will be on the inside and will not suffer further from contact with curbs and other injurious obstacles to which the outside facing is always subject. This method of transposition also keeps the tires revolving in the same direction as when used on the rear wheels.

Proper Inflation Essential in Tire Preservation.

Over 75 per cent. of tire wastage, according to the pneumatic tire engineers, comes from the failure of the motorist to observe the rules for tire inflation. The proper pressure in a tire varies according to the size of the casing and the load to be carried, a table of these pressures giving the pounds per square inch being shown on this page.

To follow out this formula for inflation it is of course necessary to know the approximate weight of the load on each wheel, which can be determined by weighing the car with its full load of passengers, water, gasoline and whatever accessories and equipment are to be carried. After the total weight is determined run the car on the scales as far as the middle of the running board, which would be the approximate centre, and get the weight of the front of the car. Do the same with the back and if the car is backed on to the same point in the centre as was used in weighing the front, the total should be within a few pounds of the weight of the whole car as determined at first and, of course, half of the front or rear weight would give the weight carried by each of the wheels on the front or rear axles respectively.

Methods of Determining the Right Pressures.

There are also standard methods employed by engineers through which the essential inflation pressure can be determined to a degree of certainty.

The manufacturer fixes a maximum pressure for inflation, which is determined very carefully. There is a limitation to the load that can be carried on a given tire. The side walls of the tire will flex under load and it will become flattened. If the width of the tire under the wheel exceeds by 10 per cent. the width of the tire on top of the wheel the load is greater than can be carried in safety, that is, with regard to the endurance of the shoe. By this is meant that if a tire has a cross section diameter of $3\frac{1}{2}$ inches and it measures under a given load where it contacts with the road not more than $3\frac{27}{32}$ inches, it is not loaded beyond the limit of safety, but if it measures $3\frac{28}{32}$ it is too heavily loaded. In such an event there would be two courses open, the one to increase

the inflation pressure until the cross section measured less than $3\frac{28}{32}$ inches, or to reduce the load until the same result were obtained. But if the maximum inflation pressure has been reached there is no alternative than to lessen the load upon the tire until the width of the cross section carrying the weight is $3\frac{27}{32}$ inches.

All tire engineers agree that the load carried by a shoe inflated to the maxi-

Carrying Capacities and Air Pressures of Pneumatic Tires

		Air		
		Pressure	Rear	Front
28x3	in.	50 lbs.	350 lbs.	450 lbs.
30x3	in.	50 lbs.	375 lbs.	475 lbs.
32x3	in.	50 lbs.	375 lbs.	475 lbs.
34x3	in.	50 lbs.	400 lbs.	500 lbs.
36x3	in.	50 lbs.	425 lbs.	525 lbs.
29x3½	in.	60 lbs.	450 lbs.	550 lbs.
30x3½	in.	60 lbs.	475 lbs.	575 lbs.
31x3½	in.	60 lbs.	500 lbs.	600 lbs.
32x3½	in.	60 lbs.	525 lbs.	625 lbs.
34x3½	in.	60 lbs.	575 lbs.	675 lbs.
36x3½	in.	60 lbs.	625 lbs.	700 lbs.
30x4	in.	70 lbs.	550 lbs.	700 lbs.
31x4	in.	70 lbs.	575 lbs.	725 lbs.
32x4	in.	70 lbs.	600 lbs.	750 lbs.
33x3	in.	70 lbs.	625 lbs.	775 lbs.
34x4	in.	70 lbs.	650 lbs.	800 lbs.
35x4	in.	70 lbs.	675 lbs.	825 lbs.
36x4	in.	70 lbs.	700 lbs.	850 lbs.
37x4	in.	70 lbs.	725 lbs.	875 lbs.
38x4	in.	70 lbs.	750 lbs.	900 lbs.
40x4	in.	70 lbs.	800 lbs.	950 lbs.
42x4	in.	70 lbs.	850 lbs.	1000 lbs.
32x4½	in.	80 lbs.	800 lbs.	1000 lbs.
33x4½	in.	80 lbs.	850 lbs.	1050 lbs.
34x4½	in.	80 lbs.	900 lbs.	1100 lbs.
35x4½	in.	80 lbs.	950 lbs.	1150 lbs.
36x4½	in.	80 lbs.	1000 lbs.	1200 lbs.
37x4½	in.	80 lbs.	1050 lbs.	1250 lbs.
38x4½	in.	80 lbs.	1100 lbs.	1300 lbs.
40x4½	in.	80 lbs.	1200 lbs.	1400 lbs.
42x4½	in.	80 lbs.	1300 lbs.	1500 lbs.
33x5	in.	90 lbs.	950 lbs.	1200 lbs.
34x5	in.	90 lbs.	1000 lbs.	1250 lbs.
35x5	in.	90 lbs.	1050 lbs.	1300 lbs.
36x5	in.	90 lbs.	1100 lbs.	1350 lbs.
37x5	in.	90 lbs.	1150 lbs.	1400 lbs.
38x5	in.	90 lbs.	1200 lbs.	1450 lbs.
39x5	in.	90 lbs.	1250 lbs.	1500 lbs.
41x5	in.	90 lbs.	1350 lbs.	1600 lbs.
43x5	in.	90 lbs.	1450 lbs.	1700 lbs.
36x5½	in.	95 lbs.	1250 lbs.	1500 lbs.
37x5½	in.	95 lbs.	1300 lbs.	1550 lbs.
38x5½	in.	95 lbs.	1350 lbs.	1600 lbs.
40x5½	in.	95 lbs.	1450 lbs.	1700 lbs.
37x6	in.	100 lbs.	1350 lbs.	1600 lbs.
39x6	in.	100 lbs.	1450 lbs.	1700 lbs.
41x6	in.	100 lbs.	1550 lbs.	1800 lbs.

mum should not increase the width of the cross section carrying the load more than 10 per cent. The figures quoted in the illustration are the nearest that can be given in inches without the use of decimals. Obviously the exact measurement would be .35 inch, and $11\frac{1}{32}$ inch, which has been stated as the limit, is .34275 inch, which is approximately correct. Innumerable tests and experi-

ments have proven that this 10 per cent. increase of width of tire cross section is the maximum. If this width is exceeded the side walls may be rim cut and there is strong probability that the fabric, which is impregnated with rubber and held by the compound covering it, will be broken. These results will follow in any event a continued use of the tire that is overloaded.

While the tire structure as a whole will yield and flex when inflated to maximum, it is protected by the air content which prevents the side walls bending so sharply that the fabric will break. A 30 by three-inch tire will have an air content of about 400 cubic inches, a 30 by $3\frac{1}{2}$ -inch tire 545 cubic inches, a 34 by four-inch tire 745 cubic inches, a 36 by $4\frac{1}{2}$ -inch tire 1000 cubic inches and a 38 by $5\frac{1}{2}$ -inch tire 1640 cubic inches. This statement is made to show that the cubic inch air content increases very rapidly with the increase of the tire size.

Use of Oversize Shoes Gives Better Cushioning Effect.

The resiliency of the tire depends directly upon the air content, upon the inflation pressure, and upon the thickness and consistency of the carcass and the tread material. As the air pressure is equal upon all parts of the tire walls it is increased or decreased as the load is varied. The lower the inflation pressure upon the tire, so long as the width carrying the load does not exceed 10 per cent. of the normal width of the cross section, the greater will be the margin of safety. By this is meant that if a maximum inflation pressure is fixed at 80 pounds, and this can be reduced to 55 pounds and the cross section carrying the load not exceed by 10 per cent. the normal width of the tire, the vehicle will ride easier and there will be a very material reduction of the stresses upon the shoe. The greater the inflation pressure the more the resiliency is reduced.

Emphasis may be made upon the use of oversize tires, or shoes that will not be loaded to capacity. These will have excess resiliency because they are not inflated to maximum, and they will endure longer because they are stronger structurally. So long as they are used with sufficient air pressure that the static load upon them will not compress the cross section contacting with the surface so that the width is more than 10 per cent. of the normal diameter there can be no danger of damage from rim cutting or breaking of the fabric of the side walls. In other words, the tire that is not loaded to its capacity can be used with reduced air pressure, and the standard by which either load or inflation can be determined is measurement of the cross section. This may be made with a caliper or a rule having a fixed jaw about four inches length at one end and a sliding jaw, the reading being made between the jaws in inches or by simple marks that will indicate the normal width of the cross section of the tires of a vehicle and the maximum of 10 per cent. additional.

The reason that tires are frequently overloaded is that the manufacturers of

vehicles will equip them with shoes that will just carry the estimated load, because larger tires will cost more, and when the equipment is increased, which is very frequently the case, or more passengers than there are seats for are carried, the total weight is excessive. If the tires are driven with reduced pressure the side walls of the tires are excessively flexed. One should remember the tire has very narrow limits of cubic inches air content if it will just safely carry the rated load, and deflation is extremely probable. For this reason frequent examination, preferably with a jawed slide rule, or with a pressure gauge, is not only desirable, but necessary if the owner wants to obtain practical tire economies.

Load and Tire Size Regarded in Determining Pressures.

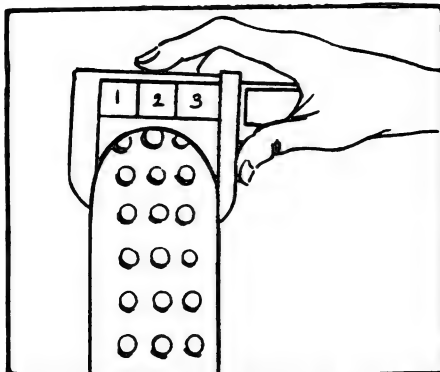
Regardless, however, of what rule a man is to go by in determining the proper pressure for his tires, the load should be regarded as well as the size of the tire, as is provided for in the scale shown. In any event it should be remembered that underinflation is the most ruinous factor in tire wear, as flattened tires permit of constant distortion in the tire fabric throughout and tends to generate heat which vulcanizes the rubber in the walls with the ultimate result that the component parts are separated and cracks develop so that structural weakness develops. The tire soon plays out in this condition and is not worth repairing.

Persons who run their cars on tires with low inflation pressure to secure better cushioning effects do so at a very great expense, as instead of paying for the mileage that they do not get out of their tires on account of thus abusing them, it would be more practical and cheaper to install oversizes all around. Oversize tires give a larger air cushion and, therefore, do not have to be inflated to as high a pressure as the standard size to carry the same weight and while the first cost is of course greater, the ultimate cost would not be as great as in the case of using regular sizes and running them without proper inflation.

Every motorist for this reason should carry a tire air gauge in his kit so that he can tell at any time what the pressure is in each tire. This precaution will work considerable good in the tire conservation movement, but it must be admitted—and it is a regrettable admission—that many motorists after determining the pressure in their tires would take no further action even if it were found that the inflation was insufficient, unless they were close to a garage where an available supply of tire air under pressure was available. For this reason those who have a marked aversion to using the hand pump or those too feeble to do so, should immediately provide themselves with a power driven pump, of which there are many types and styles on the market, and that require little effort to put in operation except the trouble of fitting the air tube nipple to the tire valve and turning a switch.

Thousands of motorists evidently labor

under the illusion that their spare tires when strapped on the back are not suffering any deterioration or wear as long as they are not fitted to the wheels. Every tire placed in an exposed position on a car and kept for use in case of a blow out should have a durable case or covering to protect it against the light

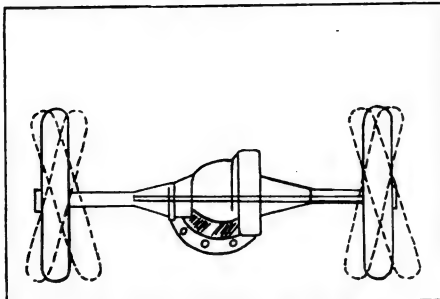


Showing Method of Applying Slide Rule in Gauging Inflation.

and heat of the sun, two elements which have a marked and deleterious effect on the composition that is used in tire manufacture and which will in time so harden it that cracks will start under comparatively light strain or use. This advice should also be followed with used tires that are being carried as spare.

It will become understood by every motorist after he has considered the various factors in the situation, that much of the economy in tire consumption can be put into effect long before it ever becomes necessary to take the tires to the repair shop and that he should give immediate attention to every small cut or bruise that he discovers on his shoes in order to remedy the damage before it becomes extensive, as a wound in a tire casing is much like a hole in a dike; small at first, but if not stopped up, becomes enlarged very rapidly. This "stitch-in-time" principle alone, if followed by every motorist would save millions of dollars worth of tires that go to the junk heap prematurely.

The urgency of this action in the con-



Wobbling and Twisting Motion of Wheels on Sprung Spindles or Loose Bearings Wear Treads.

servation movement was recently brought to the attention of the subscribers in the account of a test recently held by a tire manufacturer in which nine tires were run under similar conditions until they failed to give further service. The average life of the tires was 6500 miles. Two averaged 9500 miles each and the remaining seven covered an

average of a little over 5000 miles each. Everyone of the seven blew out within 1200 miles after being cut slightly by sharp stones or glass, so that the fabric was exposed to the action of the sand and water while the first two tires ran until they were actually worn out, as would the other seven had they been given proper care and the little cuts and bruises been vulcanized in time.

Small holes in the outer rubber casing start most of the troubles that motorists experience with tires, as through these holes the casing is exposed, to start sand blisters and to water and dirt that rots the fabric.

There are vulcanizers on the market which can be used for vulcanizing small cuts and bruises on tires without removing the latter from the wheel. These can also be used for repairing tubes and as they take up very little room should be found in every motorist's kit if he intends to do his share in the conservation of tire products as well as labor. It should be remembered that vulcanizing practically restores an injured part of a casing or tube to a condition as good for all practical purposes as when it was first purchased and if this type of repair is made in every case immediately after a bruise, cut or puncture is discovered, the car owner can expect to secure 100 per cent. service from his tires.

Tire manufacturers are also calling the attention of motorists to the fact that there are too many tires being thrown away or sold to the junk men before they are broken down for good. In fact one company recently stated in a publicity announcement in connection with the conservation campaign, that few tires were completely worn out when thrown away and that most of them were capable of considerable extra mileage if given a little help. A rim cut patch or an inside tire protector in many cases where the carcass is cut and weak will give several hundred additional miles of service to the tire. Tires that seem hopelessly cut and broken can often be restored to use in this way. These rim cut patches are applied on the inside of the tire and have flaps which fit underneath the bead of the tire on both sides as a means of holding the patch in place.

Inside tire protectors provide a complete reinforcement for the entire casing of a worn and weakened tire and make it serviceable for from 500 to 1000 miles of travel. There are numerous other things that can be found in an accessory dealer's store that help in giving first aid to an injured tire or which will enable one to put the discarded shoe back on the wheel and make it give service for a month or two longer.

A number of tire fillers are now on the market which can be used in casings that have little left but the fabric. These fillers are also used by thousands of motorists as a means of avoiding punctures; the use of inner tubes or spare rims, as they will outlast any casing. Some manufacturers report instances where users have secured from 10,000 to 20,000 miles from a shoe used with the filler.

ECCELENE STIMULATES AND TEM- PERS GASOLINE TO ADVANTAGE.

All products have a greater value when they are hard to get. The water is always missed most after the well has gone dry. Gasoline or motor fuels, and the latter is a better name nowadays for the material which is furnished, have not gone dry, but they are of very much lower grade, and are not usually as efficiently used as was the old 76 degree gasoline in the early days. Yet as a matter of fact the present lower or heavier grades of motor fuel oils contain more heat units and consequently more power than did the 76 degree gasoline. The trouble in the past has been that motorists have not been able to properly use the heavy fuel so as to make use of these added heat units. This is shown conclusively by the carbon deposits in the fire chamber, and on spark plugs, choked mufflers and motor fuel liberally mixed with the oil in the crank case. This motor oil in the crank case thins out the lubricating oil and makes it much less efficient. It is now necessary to drain the crank case every few hundred miles instead of using the oil for a thousand miles or more, as was once the case. Carbon deposits in the fire chamber cause the motor to knock or pound. Should this carbon get sufficiently hot it will cause a poor ignition and overheating of the motor. Carbon on the spark plugs short circuits the plug. The choked muffler delays the exhaust gasses from escaping, and so causes back pressure that might effect the prompt closing of the exhaust valve. This would result in the loss of motor power and added waste of fuel. A method of correcting all these evils has been recently made known, and it is now possible to use the lower or heaviest motor fuels without the great waste and without motor trouble. Eccolene properly mixed with the motor fuel will make it possible to so improve this firing mixture that the heavy ends of the motor fuel are efficiently consumed, and so consumed that they add power to the motor instead of causing carbon deposits in the fire chamber and on spark plugs, and condensation, causing the mixing with the lubricating oil in the crank case. Ralph De Palma, the speedy champion; Louis Chevrolet, Ralph Mulford and many other stars of the racing world, and many business firms and factories are today using this material and have testified to its qualities and its ability to perform the apparent miracles claimed.

Distributed by Edward A. Cassidy Co., New York City.

SEWELL CUSHION WHEEL CO. DECLARES 7 PER CENT. DIVIDEND.

At a recent meeting of the directors of the Sewell Cushion Wheel Co. a seven per cent. cash dividend was declared on both the common and preferred stock.

The Largest and Most Powerful Car Ever Used Successfully on the Road

The outbreak of the war in 1914 upset European car manufacturers so that their plans for developing new racing creations were suspended, although many surprises were in store for the racing fans at that time.

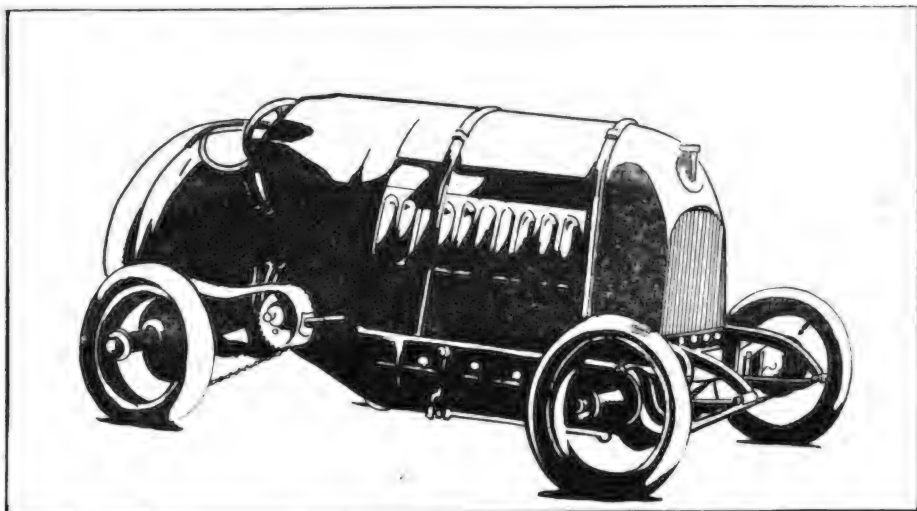
The Fiat company of Turin, Italy, which had always figured conspicuously in the racing field in Europe, as well as this country, had been experimenting with heavy high powered cars in 1912-13 and had placed on the tracks an extraordinarily large and heavy car, which was known as "Mephistopheles," having cylinder dimensions of 190x160 mm. (18,145.9 c. c.) This machine was generally supposed to be the largest car for power and weight ever built, although the company subsequently built a larger one in an attempt to secure the world's

mm., or approximately 7 7/16 inches and 9 7/8 inches respectively, with a piston displacement of 28,352.9 c. c., which is approximately 1730 cubic inches. It was rated at 300 horsepower.

The overhead valves and long stroke necessarily made it a very high engine, and while there was no extra space provided in the tall hood for the sake of appearance, it stood five feet, seven inches from the ground.

PROPER CYLINDER LUBRICATION.

The perfect lubricant for gas engines should either be consumed entirely in the cylinder or not at all. An eminent authority on gas engine cylinder lubrication after many experiments found that the lubricant that was not consumed at



The Fiat 300 Horsepower Racing Car Which Has a Total Piston Displacement of 1730 Inches.

flying kilometer record. This latter car was to have been raced on the Brooklands track by the famous Italian pilot, Nazzaro, who tried it out over Italian roads first. Before the time came for taking the car to England Nazzaro started his own automobile factory and the big Fiat was turned over to Bordino, another Italian pilot. Bordino took it to Brooklands, but did not develop the speed that had been anticipated owing to the huge size of the car and difficulty of making the turns.

There was very little known about the actual capacity of this car, although it was built nearly seven years ago and most of the time since then has been in storage at the Fiat factory in Turin. A recent communication, however, from the factory to the Autocar of London revealed a number of the mechanical specifications, which prove that the racer is the largest car ever built as regards engine capacity. The engine has four cylinders, which are cast en bloc, with enclosed overhead valves. The cylinders have a bore of 190 mm. and stroke of 250

all retained its full lubricating value as long as it remained in the cylinder. On the other hand the lubricant that is only partially consumed leaves a carbon deposit, while the lubricant that is entirely consumed leaves the cylinder dry.

Flake Motor Graphite meets the requirements fully because the intense heat encountered in the cylinder has no disintegrating effect whatever on graphite. There are a number of devices that are made for feeding motor graphite to engine cylinders.

GENERAL MOTORS INCREASES CAPITAL STOCK TO \$300,000,000.

The stockholders of the General Motors Corp. at a special meeting held in Wilmington, Del., voted to increase the capital stock from \$200,000,000 to \$300,000,000. The increase in the capitalization raises the preferred stock from \$50,000,000 to \$100,000,000 and the common stock from \$150,000,000 to \$200,000,000.

Manufacturers and Jobbers of Accessories Explain the Situation As It Affects Their Business

Committee of National Association of Automobile Accessory Jobbers Hold Conference With War Industries Board Representatives and Present Brief of Conditions in the Industry for Government Consideration—Organization Abandons Plans For Fall Exposition

THE show committee of the National Association of Automobile Accessory Jobbers has announced that plans for the first exhibition of accessories to have been held under the auspices of the organization at Chicago during the week of Oct. 28 to Nov. 2, at Medinah Temple, have been abandoned in deference to the wishes of the government.

"In consequence of the war conditions your committee having carefully reviewed the situation, studied it from various angles and considering the further fact that by direction of the board of directors a committee has just visited Washington for the purpose of ascertaining to what extent the manufacturers may secure raw material and what the jobbers' course will be in disposing of his goods, and while in Washington the committee conferred with Mr. Redfield, secretary of commerce, and among other things sought his views as to the wisdom of carrying on the exhibit," states the announcement.

Secretary Redfield's advice was:

"Go slow with your exhibit. In this terrible war we are in it will require every ounce of ammunition, every bit of energy, every available man, every dollar we can spare to win," and taking all of this into consideration we feel that there is no place for an exhibit or show at this time. On the contrary, we are of the one opinion that anything in the nature of an exhibit or show should be absolutely discountenanced and discouraged during the war period.

Brief Submitted to War Industries Board by Committee.

In the same bulletin in which the announcement was made to members, the report of the committee that conferred with officials at Washington was published, including the statement made by Commissioner William W. Webster of the N. A. A. A. J., who was chairman. This committee conferred with Rhodes H. Baker of the Priorities Committee, and Mr. C. C. Hanch, director of the Automotive Products Section of the War Industries Board. In the brief on behalf of the organization which was presented by Commissioner Webster, he explained the character of the business in which the members were engaged in; the extent of its scope and the enormous

number of customers that were dependent upon it for parts, supplies, equipment.

His statement in part was as follows:

"This committee represents practically every large manufacturer and dealer in automotive equipment in the United States, as follows:

Jobbers.....212 members

Manufacturers.....230 members

"By way of explanation would state that the business of our members is practically all with cars that are in use. Once a machine is put into use it automatically comes into the branch of the industry which we represent.

Manufacturers Market Most of Their Product Through Jobbers.

"This committee has made a survey of the industry and find there are 118 jobbers outside of our membership. It is our business to familiarize ourselves with and know the conditions surrounding our line of business and those who are engaged in it either in a manufacturing or a jobbing way.

"The associate members of our association (manufacturers) market the larger portion of their product through the automobile jobbers (members of this association), as well as to non-members who are jobbers.

"Having thus explained the nature of our business we now appeal to you for some ruling that will clearly define what in your judgment you may consider essential and non-essential lines of this industry that may be privileged to purchase these goods in order that manufacturers and wholesale dealers in the line may know to whom they may or may not supply the replacement parts.

"We wish to point out in placing this matter before your board that we do not seek this information for the purpose of exploiting business generally in the commercial sense of the term, but rather for the express purpose of keeping a free flow of replacement materials for the great number of automobiles engaged in purely war and commercial activities contributing thereto, and it is our sole purpose and disposition to do only those things that are in keeping with your desires and that will render the best service to our government, and we stand ready and willing to cooperate with you in all possible ways, but we point out

that in the absence of any specific ruling or authentic information as for whom we may or may not fill such orders, outside of purely war purposes or who may be considered by you as essential, we naturally appeal to you for this information * * *

"In order to acquire all information and of the latest date we have just recently solicited and received several hundred replies to letters that were sent out to our members, both manufacturers and jobbers, and from whom we sought advice and information simply in a preliminary way in order that we might have it to present their viewpoints to you for consideration and in the thought that it may be of some assistance to you in telling us what we desire to know. Some of these were from very large firms, others fair sized, and some small institutions who are scattered all over the United States from the Atlantic to the Pacific and from the Gulf to the Canadian border.

"A large number of these replies have stated that on their present understanding they cannot conscientiously sign the pledges generally presented to them or required for them in receiving stock, for they know of no guide at the present time that would fairly and conscientiously permit them to dispense with or dispose of such goods as the manufacturers may supply to the jobber or the jobber to his trade in the ordinary course of business. Furthermore, it is obvious the manufacturer must be supplied with raw material in advance of the orders received or remand placed upon him so that he may have an opportunity, especially with the present scarcity of labor, to properly execute same and have them ready when orders are received. Again another question that confronts the jobber is in receiving such goods he places them in stock not knowing at that time through what channels they may be disposed of, and

**Very Light Stocks in Hands of Makers
and Jobbers.**

in the present frame of mind and feeling of the jobbers as explained above, it inclines us to the belief that even now in many cases replacement parts that are actually and urgently needed for war or commercial purposes or for matters in-

cident thereto are being withheld or denied, which may tend in a way to defeat rather than to serve the very purpose of your own wishes and ideas and thereby harm done, though innocently as it may be, for reasons stated here.

"We wish to further point out that the impression has prevailed, at least in some quarters, that both manufacturers and jobbers have large stocks on hand and our information through these various letters referred to above indicate that some have only 30 days supply, but none have advised that they have over 90 days supply and both manufacturers and jobbers have advised that they are experiencing great trouble even now in getting their raw materials or finished products."

After citing instances where manufacturers of truck parts were unable to supply large orders through lack of raw materials and the crying need of the times for greater transportation facilities that must be met by truck haulage, Commissioner Webster pointed out the essential need of a plentiful supply of parts to keep those commercial vehicles now in use in service.

Essentiality of Necessary Replacement Parts and Stocks.

Referring to this situation the statement continues:

"And we now wish to point out the essentiality of necessary replacement parts and stocks of repairs for all of the foregoing and it is obvious that these stocks should be generally distributed in all parts of the country so as to render quick and efficient service when needed and we therefore naturally ask what your intention or ruling when such equipment so engaged becomes disabled? If it is to deny them the renewal or replacement parts they will have to go into disuse.

"We wish to further point out with the alleged rumored reduction of new cars that will likely go into effect that it would seem all the more necessary that this great army of used automobiles which is now in service will have to be pressed into even greater service as time goes on, and many being old or used cars it is likewise obvious that the upkeep will constantly increase."

Following the citation of instances showing that the jobbers are at this time a prominent factor in the quick handling of business as depots and distributors for the advantage and use of supplying the government needs and for essential activities, further proof of the great work being accomplished by both passenger cars and trucks in the present emergency was submitted. Appended to this was a classified list of 36 different commercial and civilian occupations that are practically dependent upon the use of motor driven vehicles and which are also indispensable.

To Give the Maximum Encouragement to Repair of Trucks.

The statement concluded as follows: "We quote from the general pledge given as of date Aug. 13, 1918, applying to motor trucks, the following language: "To give the maximum encouragement

to the repair of trucks,' and we submit that this industry is the only agency through which these repairs must and do emanate. Still with all, as indicated in the foregoing, this is more or less general, and we are satisfied it is not as thoroughly understood as it should be in order to render the best service to the government and the needs incident thereto. We further wish to impress you with our disposition to exercise our every effort and influence in the proper execution of any definitions you may employ or pledge you may require to properly cover these matters both in the letter and spirit, and we respectfully ask

members must naturally follow if these replacement parts are denied or cannot be had, and will, we fear, seriously impede business generally and stop deliveries which in a variety of ways are so necessary to the success of the government and the conduct of the war."

After the committee had made additional explanations regarding the business of the accessory manufacturers and jobbers, the representatives of the Priorities Committee and War Industries Board stated that it would be necessary for the committee to secure from its manufacturer members information as to the output in tonnage, fuel and power consumed, number of employees, volume of business and character of goods made, as to whether essential or non-essential.

Another Hearing Will Be Granted After Reports Are Made.

It was also suggested to the committee that they have the members mark in their catalogues the articles considered non-essential, and that after this information has been submitted another hearing will be granted.

Commissioner Webster also announced that the committee had received reasonable assurance in its conference that if the industry could be placed on a strictly essential basis the manufacturers would receive such proportion of steel and other metals as is their proportion of all the materials which it will be possible to divert from the war program of the government.

To carry out his plan the manufacturers, jobbers and dealers are asked to sign a pledge which is as follows:

"I do hereby pledge myself not to use or so far as lies within my power, permit the use of any stocks now in or which may hereafter come into my possession or control, save (1) for essential uses as that term may be defined from time to time by the Priorities Division of the War Industries Board, or (2) under permits in writings signed by the director of steel supply; that I will make no sale or delivery from such stocks to any customer or retailer before thus filing with me a similar pledge in writing; and that I will use my utmost endeavor to prevent the hoarding of stocks and to insure that they be distributed solely for essential uses."

C. H. GRESSLEE DISTRICT SALES MANAGER ALL-AMERICAN TRUCK.

Charles H. Gresslee has been appointed district sales manager for the middle western section of the country for the sale and distribution of the All-American AA one-ton truck.

For the past 18 months Mr. Gresslee has been division sales manager for the Selden Truck Sales Co., having an office at Cincinnati. Prior to his connection with the Selden company he was for three years general manager of the Union Petroleum Co. of Philadelphia and one year sales manager of the Franklin Oil and Gas Co. of Bedford, O., and for three years vice president of B. A. Stuart & Co., Inc. of Chicago.

Essential Users of Trucks and Passenger Cars

Retail Druggists.....	45,880
Agricultural Implement Dealers	15,258
Retail Bakers.....	24,674
Wholesale Bakers.....	2,261
Banks	28,987
Canners of Fruits and Vegetables	2,670
Fish and Oyster Dealers..	4,500
Fish and Oysters, Wholesalers	1,047
Flour Mills	12,159
Fruit Dealers, Wholesalers	2,663
Retail Grocers	172,842
Butchers and Meat Markets	55,819
Wholesale Grocers.....	5,045
Retail Hardware Dealers.	28,979
Wholesale Hardware Dealers	10,634
Coal Miners and Shippers	6,159
Harness and Saddlery Dealers	18,486
Hay, Grain and Flour and Feed Dealers	34,218
Hotels	13,740
Coal Dealers.....	29,128
Ice Dealers.....	6,254
Dairies and Creameries...	6,112
Lawyers	102,034
Retail Lumber Dealers...	30,925
Wholesale Lumber Dealers	3,800
Farmers	2,612,235
Physicians	131,495
Flour and Grist Mills.....	13,358
Sanitariums, Hospitals and Asylums	6,727
Stock Breeders.....	12,000
Newspapers	18,626
Undertakers	20,688
Nurserymen, Seedsmen and Bulb Growers.....	5,057
Veterinary Surgeons.....	5,399
Manufacturers of all kinds	139,630

that you give the foregoing your careful consideration, and in conclusion we wish to point out that this is not in any way exploiting a new business or expanding present business activities, but simply as indicated above, a question of obtaining the necessary materials and replacement parts that will keep the great army of used automobiles, trucks and tractors that are now used for war and commercial purposes and such other purposes as you may think proper in active service and the general retirement of great num-

Dissecting the Values In a Used Car

Certain Methods Necessary to Use in Locating Defects in the Various Parts—The Value of the Car Is Dependent Upon the Condition of Several of the Most Vital Working Parts

IN PURCHASING a used car the purchaser should know the elementary tests through which to put the car, in order to judge its value. The record of the use of the car, more particularly the carefulness of its former owner in driving and adequately taking care of it, is important to know, for it may have been driven 15,000 or 20,000 miles with good judgment and care and be worth more

ment in the selection of a used car, by thoroughly inspecting its vital working parts and putting it through a series of tests as follows:

As it is not possible to take down the engine, the gear set and rear axle for critical examination, as the cost would be considerable, certain practises of examination and tests can only be followed out in order to prove its practical worth.

pression, turn the crankshaft over by hand. If you can feel a fair weight of resistance against a quarter turn, or a number of turns, noting the comparative resistance of each cylinder and the resistance of all, the compression is tight enough to hold. A better method of testing compression is by using a regular compressometer, which, in turn, is screwed into the spark plug opening of

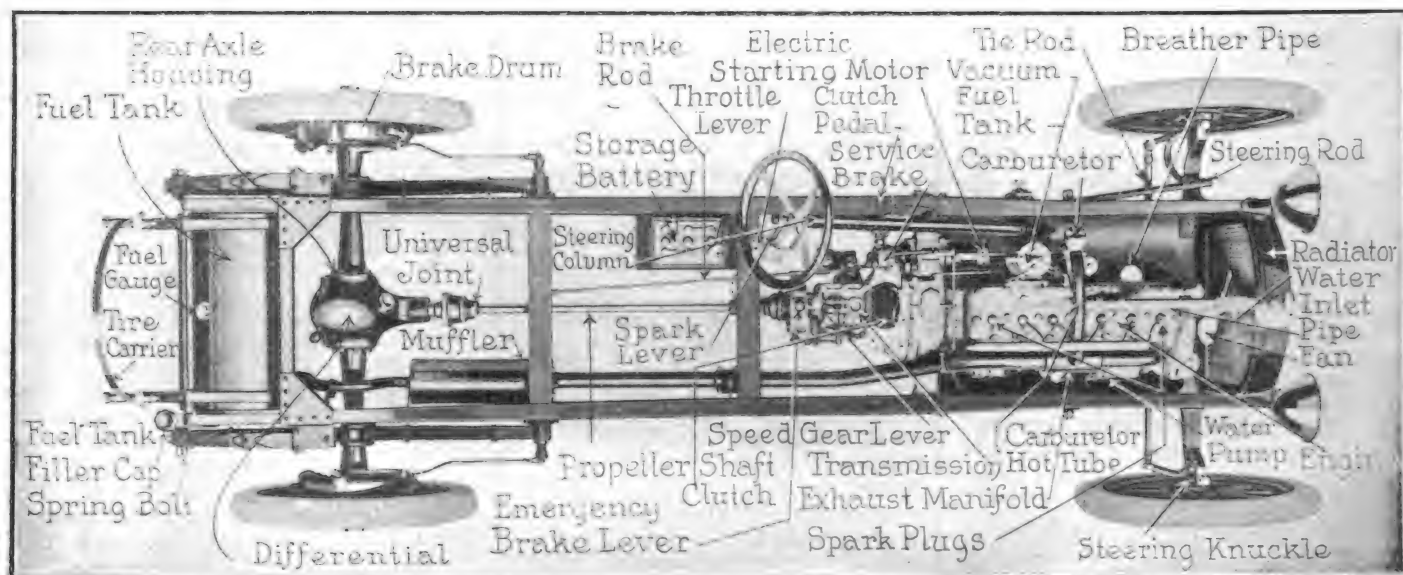


Diagram of the Various Parts on a Chassis Referred to in This Article as Requiring Inspection in Examining a Used Car to Determine Its Condition and Cost of Making Repairs, Replacements and Adjustments.

than a car driven the same distance which had been abused by reckless driving and indifferent care.

One should not be influenced in purchasing a used car by its appearance alone, for it may have a body that looks almost like new and the "guts" of the machine in an advanced state of dilapidation. The safest way to judge of the real practical value of a car is to base its most intrinsic worth on the condition of its vital working parts underneath the hood and the body. A new body can be purchased at a reasonable price or the old one repainted and varnished, dents taken out, worn upholstery repaired or entirely hidden by a set of seat covers; and if the lamps and essential other accessories are missing or in bad condition, they can be replaced or repaired at a slight cost as compared with the greater expense of replacing an entire new power plant, new gear set, or new axle or new axle gears.

It is prudent, therefore, to ascertain just what kind of drivers handled the machine. As the history of a used car is not always easily obtainable, it is always best to exercise one's own judgment

Fifteen Important Tests of Used Cars

In the examination of a used car the main points to be observed are here given in a nutshell:

- Test the compression.
- Examine engine suspension.
- Look for broken housings.
- Examine radiator.
- Look at gears in gearset.
- Look at bearings in gearset.
- Examine rear axle for lost motion.
- Go over steering gear.
- Measure for wheel alignment.
- Try both sets of brakes.
- Note condition of tires.
- Look over all springs.
- Try out electrical installation.
- Test the battery.
- Make general road test.

Test the Compression.

To run satisfactorily an engine must have good compression, not only in one, but in all cylinders. To test the com-

pression in each cylinder tested separately by turning over the crankshaft. The gauge will register the number of pounds pressure in each cylinder, and the cylinders showing the least compression are the ones that need attention to bring their compression up to equal that in other cylinders. Another test is to open all the relief cocks in the heads of all the cylinders, excepting No. 1, against which you test the compression, by turning the crankshaft; then, in turn open the petcocks on all the other cylinders, excepting that of No. 2, on which you are making the test, and continue the test in the order you started. Good compression in an engine is determined by a springy resistance when the crank shaft is turned over. If the engine cranks freely, it is a sure sign that the compression is weak all around. It is advisable to make these proving tests for lost compression after the car has been run for five miles or a motor run idle commensurate to that distance. In this preliminary test it is possible to detect any other weakness that might in whole or in part be the cause for lost compression, as, for in-

stance, if the lubricating oil is cold or very heavy, it will fill up depressions or scores in the cylinder walls which might exist, thus giving the engine more compression than it had under ordinary operating conditions. While the engine is being run, note whether there is black or excessive smoke from the exhaust, which is an indication of excessive oil escape-ment into the combustion chambers, caused by a surplus amount of oil in the base, imperfect, scored or worn cylinders, or improperly fitting piston rings. A surplus amount of oil in the base will give a temporary addition of power and compression to the engine, especially if the cylinders have been scored or worn out of round. The same condition will prevail if too heavy oil is used. Drain some of the oil from the base and let it stand for about 15 minutes, and then you can tell whether it is heavy, medium or light.

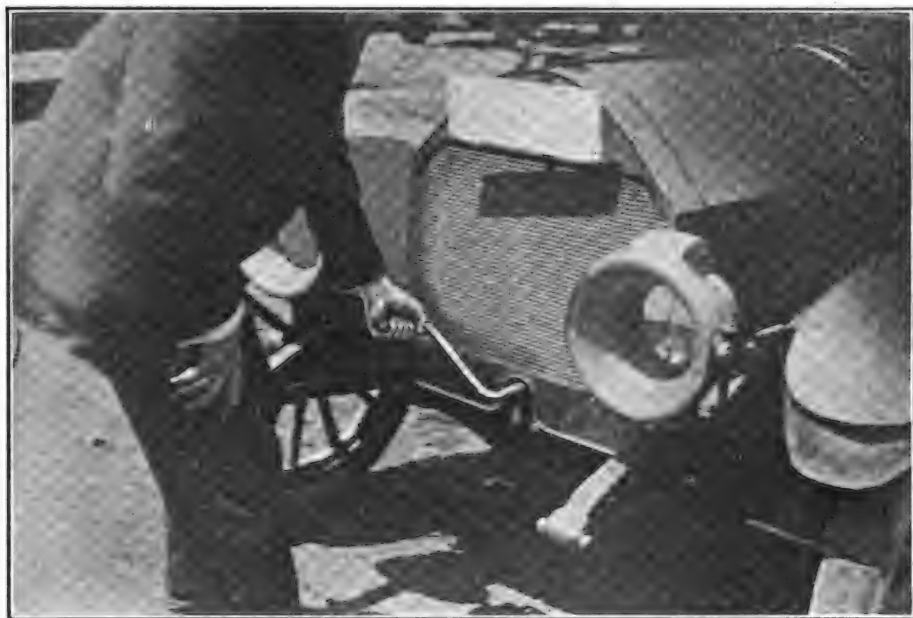
Other Points of Engine Examination.

Throttle down the engine to about 400 revolutions per minute. If it does not backfire or miss it is in good condition. Testing the engine running at from 2000 to 3500 revolutions per minute develops nothing but noise and does not give one the opportunity to detect the defects that the slower speed will give.

Make a careful examination of the engine's suspension, to see that none of the cross members are broken or the engine crank case cracked.

To detect a leak of lubricating oil, look at the outside of engine and transmission cases and if there is any considerable accumulation of oil there, a source of leakage may be found, which is usually due to worn bearings or joints between casing not being properly packed.

Examine the valves and valve tappets. Wear in the valve guides can usually be remedied by replacing the bushings. If,



Cranking to Try Compression, First Test Made in Inspecting Condition of Engine.

on the old parts there is left no room for adjustment, new parts will be necessary.

Leaks in Gasoline and Radiator.

Examine the gasoline lines and tank for leaks, which are easily repaired. Make a comparison of gasoline consumption as compared with other cars of like horsepower and size.

Carefully inspect the radiator and circulating connections for leaks. Any excessive leakage of the radiator can be easily detected by having it stand over a dry spot. At the conclusion of the road test see that the water does not boil or steam to any extent. An efficient radiator should be able to keep the water below the boiling point.

Looking for Worn Gears.

Take off the cover plate on the transmission case and examine the gears. This unit in particular has usually been subjected to abuse. If the gears have been sheared off and burrs have been formed on the teeth, the operation of the transmission will emit a grating and noisy sound when shifted. If such a condition is found and allowed to continue, before long the teeth of the gears will break. Any lost motion in the gears can be easily taken up. The condition of the clutch arms and gear clutches in this unit is nearly as important as the condition of the gear teeth.

The rear axle housing of many cars is fitted with a large hand hole plate at the differential. By removing this plate the main drive gear, or master gear, is exposed. Although this gear receives all the power from the engine, it very seldom shows any signs of excessive wear. It is the small pinion that meshes with it that shows the most wear. The master gear is mounted on a housing which revolves with the wheels. The condition of the differential gears, which are inside of the housing, cannot be seen unless axle is disassembled. The condition of these gears can be closely estimated by these tests: Jack up one rear wheel, release the brakes and turn the wheel slowly in either direction. The action should be smooth and the shaft should turn in the transmission gear set as soon as the wheel is turned. Then put in the high-speed gear and clutch, with ignition switch in off position. The propeller shaft is now connected with the engine and the wheel can be swung back and forth, this operation indicating that any movement not affecting the propeller shaft is lost motion in the differential. Before putting back hand hole plate, it is a good plan to find whether the wheel can be turned and how far without affecting the master gear. There should be little or no lost motion between either of the wheels and the propeller shaft. The experiment should be tried (Continued on Page 58.)



Examining Wheel Alignment with Gauge to Determine if Steering Knuckles and Tie Rods Need Adjustment.

Commercial Hysteria

National Commissioner Webster of the N. A. A. A. J.
Views Situation As It Affects Jobbers

Probably one of the greatest misfortunes that can befall any business is to have the head of the institution seized with what is commonly known as modern commercial hysteria or a lack of nerve.

While it is true that we are now going through very troublesome times, it calls for every acumen, every atom of nerve and every element of cool headedness in the operation of business. Therefore, to those who are inclined to become rattled, I would suggest that they sit tight and not rock the boat in the middle of the stream, and if they will pursue this course, eventually things will come out all right, for you can rest assured in the old saying, in war times as well as in peace, there is a silver lining in every cloud, and the sun's rays will strike those who exercise calm judgment much sooner than they will those who in a moment of excitement can only see trouble in the darker recesses of their every day business pursuits.

In many instances the jobbers are packing up large quantities of materials and shipping them back to the manufacturers. In some instances it is old shop worn, obsolete goods that have been out of date for some time. In other cases new goods marketable in every way, and if the present conditions exist, restrictions in steel and other metals prevail, the jobber will, no doubt, regret before many days, having permitted this element of hysteria to actuate him and get rid of these goods, that sooner or later will be worth a great deal more money if, indeed they are at all obtainable, and this is all the result of undue excitement because there are so few goods, if any, on the jobber's shelves in the automotive equipment line that cannot and will not be used either by adjustment or transformation or something of that sort because history will repeat itself and we are finding in other lines that goods that have remained upon the shelf for years and have become obsolete are now taken down, transformed and put in use at

good market prices.

The used cars are bound to and will be run on each succeeding day will be pressed into service in greater numbers, and the longer these cars are run the more equipment they will require in upkeep and the greater chance for the jobber for not only selling stock that he bought at moderate price for more profit, but also working off lines of obsolete goods that you have seen time and again when scarcity prevails.



William M. Webster, Commissioner of the National Association of Automobile Accessory Jobbers.

There is another side to this issue. We should not return these goods without first consulting the manufacturer and consequently we should not strip ourselves of stock, for if we have the money to carry it we can make by far more profit out of the goods that are being returned than you could hope to secure from a credit memorandum that you would get on their return.

WILLIAM M. WEBSTER.

MAKE FREE RIDE PLAN GENERAL.

"The idea of displaying a sign on the windshield offering free rides to soldiers and sailors, has taken America by storm," said Mr. P. L. Emerson, general sales manager for the Olds Motor Works, in a recent interview.

"Nothing could be more typically American, or display a finer patriotic spirit. But to my mind," he continued, "that should only be a beginning. The vacant seat should be eliminated whenever possible.

"There are innumerable ways in which this idea can be applied. For instance, very often in driving through the country one passes a wayside inter-urban station at which a lone passenger waits for a car. To give such a person a lift is not merely a friendly act. Every man's time is valuable these days—essential, in fact—and the minutes saved will be turned to good account. It costs nothing to stop and the passenger will be saved money as well as time.

"Here is another case in point. You meet a traveling man at lunch in a small

town hotel dining room. His next call is at a town only 20 miles or so along the line. But there isn't a train in that direction for three hours. The town is on the route you are traveling. By giving him the necessary lift a full half day of his working time is conserved for him.

"It has been my experience that people are more than grateful for such thoughtfulness; in fact, when it is suggested to them they are more than glad to donate the actual saving of money to the Red Cross.

"Now that the government has requested the strict conservation of gasoline, every drop should be made to work to its full capacity. That means abolishing the vacant seat entirely."

MANUFACTURERS OF TIRE FILLER TO HOLD ECONOMY CONFERENCE.

Manufacturers of tire filler have called a conference to be held at the Hotel Congress, Chicago, Sept. 15-18, with the object of forming a national association of makers of standard tire filler and to draw up a plan for war time conservation of tires.

Twelve manufacturers will participate in the conference of which Frank D. Mayer is the temporary secretary. The companies interested are: The Essenkay Products Co., Chicago, Ill.; The Peerless Tire Filler Co., Chicago, Ill.; Dahl Punctureless Tire Co., Minneapolis, Minn.; Pan-American Rubber Co., Milwaukee, Wis.; National Rubber Filler Co., Midlothian, Tex.; Panama Rubber and Equipment Co., St. Louis, Mo.; Wolverine Tire Cushion and Accessory Co., 1678 Fort St., West Detroit, Mich.; Rubberair Inc., 711 Times Building, New York City; Better-Air Co., 1308 Callowhill St., Philadelphia, Pa.; National Synthetic Tire and Rubber Co., 1482 Broadway, New York City; Universal Tire Filler Co., Portland, Ore.; National Tire Cushion Co., 1511 McGee St., Kansas City, Mo.

FAWSCO OIL COCK WRENCH.

The condition of the raw material and labor market has made it necessary for J. H. Faw, Inc., to advance the list price of the Fawasco Improved Combination Oil Cock Wrench Gasoline Gauge and Cleaner from 35 to 45 cents. It became necessary to either deteriorate the quality of the product or increase the price to meet conditions and it was decided



to maintain the Fawasco standard at a slightly increased price.

Mr. Faw in a characteristic vein with which the trade is quite familiar, says that to a Ford owner who has lost his Sunday religion by soiling a clean shirt in an endeavor to find out whether he has sufficient oil in his crank case for a day's run, the slight increase in price cuts no figure; in fact, the demand has considerably increased since the new price went into effect.

The time has passed when the motor car dealer, repairman, garage owner and service station can get along with slipshod methods. The new business situation for people in this line presents problems that require more than the average amount of planning and effort which was sufficient in normal times. Every live dealer in cars or accessories or the man who makes his living by the repair and maintenance of automobiles is putting his business on a system which means 100 per cent. efficiency. No one man can evolve all the new ideas or plans, so much can be gained from the other fellow who is actually putting tried and successful methods into practise. As a means of giving the subscribers an opportunity to learn from others, the Automobile Journal is running a number of stories telling of the results being attained by practical men who have carefully studied their business with the object of placing it on a basis of maximum efficiency.

A Service Station Where Standardized Operations On Repair Work Have Brought Remarkable Efficiency

Bishop, McCormick & Bishop, Inc. Through the Use of Special Tools Equipment and Carefully Planned System of Handling Work Have Solved Many of the Problems Upon Which Depends the Prosperity of The Motor Car Dealer, Repair or Serviceman—Charges Are Made on Flat Rate Basis As a Fixed Period of Time Is Allowed For Each Job

THERE are hundreds of automobile dealers and repair men throughout the country that are at present scratching their heads in vain to arouse the idea which they know will be necessary to enable them to cope with the new conditions of business that have developed with the war activities. Many of them find themselves in the same situation as did the man who locked the barn door after the horse had been stolen.

On the other hand there are also hundreds of dealers in the country who did not wait for the situation to get to the acute stage where the old policies in the automobile trade would no longer suffice, but who put their house in order to meet any emergency should it arise and enable them to continue a profitable business against the most adverse circumstances.

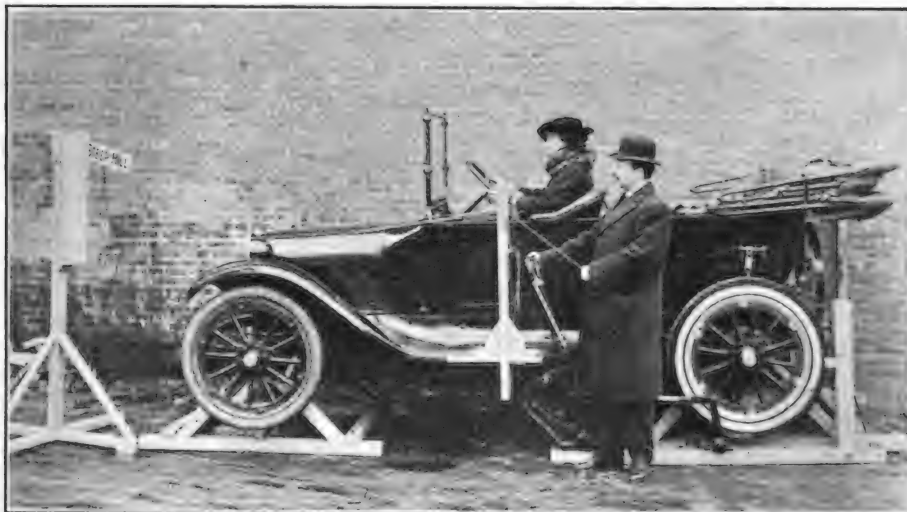
Bishop, McCormick & Bishop, Inc., Brooklyn, N. Y., distributors of Dodge Brothers, is a firm whose policies illustrate in a striking manner the possibilities that are open to every dealer who puts a little thought into his business

and systematizes it along practical lines. This company covers all of Long Island and Brooklyn and has 17 subdealers.

Burton T. Bishop, sales manager, is the type of the modern sales executive who in close team work with his associates has injected into the sales of motor cars the real science of selling. His is the new era of selling, backed up by character, conscience and an exemplary model of service, supplemented with a clear vision to anticipate the unexpected and being forearmed with the clinching argument to convince the most skeptical. He is an apt student of human nature, having a delightful faculty of

humoring the individual, natural tendencies of a prospect so as to convince him that he can have his eyes open to the truth; and he invariably closes sales with the most lingering prospects. He says that one of his most difficult tasks is to train his junior salesmen to not talk too much and talk themselves out of a sale. He instructs them to allow the customer to ask questions and to give them a chance to do so between pauses in their selling argument, for which they must anticipate and make openings.

Mr. Bishop deals with only the real facts and leaves nothing at which the prospective customer must guess. He says that once a prospective purchaser enters their sales room, he is considered 90 per cent. sold, this being principally attributable to their constant educational advertising campaign. The prospect knows in advance of his coming to their sales room what he can expect of Bishop, McCormick & Bishop, Inc. by way of their educational and mechanical service. In fact, he has already been so impressed with the great help



The Anchored Car for Instruction on Driving Operations Under Varying Road Conditions.

that the firm makes a part of the understanding of every sale that he has practically sold himself, but has merely come to the sales room to finally convince himself of the reality of what he has read in the original and convincing advertising booklets and sales letters sent him by Bishop, McCormick & Bishop, Inc. Every customer is sold in a straight forward manner, with an explicit understanding that there is no free service thrown in with the bargain. He is sold to stay sold and to first secure the impression of satisfaction that remains with him, because he has been started right.

Over 1600 Cars Sold This Season.

Bishop, McCormick & Bishop, Inc. have sold in their Brooklyn and Long Island territory this season 1640 Dodge Brothers cars. Some of the salient features that have been instrumental in their securing this business are:

A continual brilliant advertising campaign through local newspapers, their own original copy and layouts of handsome, attractive advertising matter in the form of booklets and folders, and direct personal sales letters, which are the most convincing the writer has ever seen.

An excellent mechanical service backed by the most efficient, time and labor saving machinery and mechanical equipment, supplemented with special tools of their own design, and all directed by a highly capable service manager.

An equitable, honest cost system upon which to base charges for service.

An educational department in which they train customers to become capable and careful drivers, instilling into them the practical knowledge of motor car construction and the causes of troubles and the proper adjustments and remedies by which they may be overcome by the owners' knowing first hand how to do the work. They have eliminated over 50 per cent. of the troubles that

freely come to a great majority of dealers, by fitting the purchasers of their cars to be aidful to themselves instead of helpless and an unnecessary burden to dealers and garage men.

Bishop, McCormick & Bishop, Inc. will not sell a car to a new owner unless he first proves his ability to be able to understand the principles of motor car construction, the causes and effects of irregularities, how to detect and simply remedy them, before they will have gone to the danger point, with the possibility of aiding to contribute the weakness to other parts of the car.

Burton I. Bishop, the sales manager, says that if he sold a car to a new owner who, through the lack of practical experience in knowing how to drive, collided with an obstruction and battered up the fenders and other parts, considerable of the responsibility for such an accident would reflect upon his firm. He holds that the appearance of one of their new cars wrecked in such a manner would leave a poor impression on the public, to the effect that the car was poorly constructed and lacked stability. He correctly lays the responsibility of such accidents right at the dealer's door, because he failed to thoroughly train the owner how to carefully drive the car. He says that sales of cars to irresponsible operators are examples of insincere salesmanship, that the interests and welfare of the customers make up the foundation of satisfactory sales.

Extracts from Sales Letters.

Here are a few striking extracts from several of the company's sales letters, circulated to advertise their educational department:

"There was a time when we might have agreed with you that you could not afford to own a motor car, but that time has passed.

"Economy is not a matter of doing without something so much as it is doing well with something. That thought

applies to every phase of life, but especially is it true of the use of an automobile. True economy is the science of buying more with each dollar you spend, and then making what you buy give the maximum results."—From a letter illustrated at the top with their duplex control car and a street crowded with traffic, suggestive of their driving instructions.

And these "punchy" extracts are from another letter printed on a letter head with the same illustrations:

"When Colgate & Co. couldn't improve their talcum powder they improved the box that contained it.

"As Dodge Brothers dealers we face a situation somewhat similar to Colgate's. Dodge Brothers car has demonstrated its goodness to the satisfaction of the public. Its reputation for steady, consistent performance is so well established that it is taken for granted. * * *

"The usual methods of driving instructions could be improved upon. They are inadequate and nerve-racking, leaving too much to be learned at the risk of the car. So we developed the two devices shown at the top and on the back of this letter head (duplex control car and the anchored car). With them learning to drive correctly is simply a matter of practise under easy and favorable conditions, without strain or risk. But what is most important the purchaser actually becomes a finished and experienced driver before he attempts to operate his own car. Thus we meet a responsibility as dealers." * * *

Now listen to what they say in part in another sales letter on their school for instructing new owners, printed on their letter head illustrated with a picture of their school at the top and a picture of the Dodge chassis on the back:

"The old saying, 'A poor workman is always complaining about his tools,' is just another way of saying he does not know how to use them.

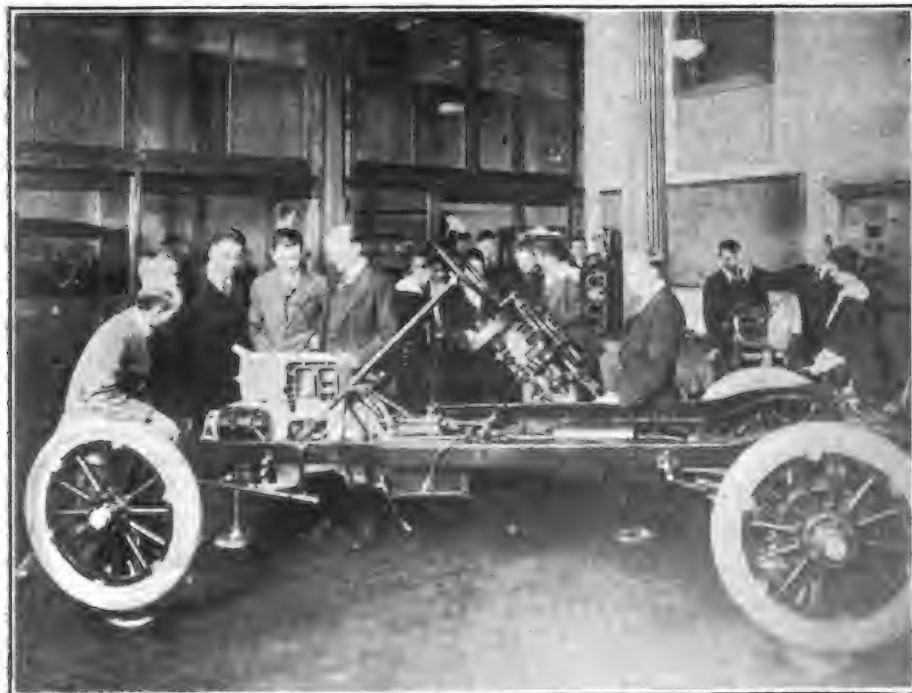
"The wonderful economies of automobile manufacturing are the result of training workmen to use tools correctly. Yet the greatest part of the maintenance cost on motor cars is a penalty paid by owners because dealers have not taken the pains to teach them all they must know about their cars to get the best results from them.

"Realizing this we developed our method of instructing owners to drive correctly. Then we started our school for owners, offering a simple, easily understood course of lectures on the mechanical construction of the car and its proper care and maintenance. The results obtained have been remarkable." * * *

Driving Instructions in the Anchored Car.

The system of driving instructions is based on the conclusion that the operation of a car is nothing more or less than the proper order of certain mechanical operations performed at the right time and in the proper manner, or, in other words, the proper training of the eyes, hands and feet.

Realizing from the start that it would be difficult to give intensive training of this kind in a car that was moving, be-



Section of the School, Showing Chassis Used for Instruction.

cause its very movement would tend to distract the pupil and prevent him from concentrating his attention on the proper performance of the mechanical operations, Bishop, McCormick & Bishop, Inc., developed a machine which they have patented and named "The Anchored Car." It is a standard Dodge Brothers motor car raised off the ground and equipped with apparatus that permits them to duplicate actual road conditions in a stationary car, with the motor running. Seated in this car the pupil practises starting, stopping, backing, climbing hills and pulling through sand before he attempts to put a car into actual operation on the road.

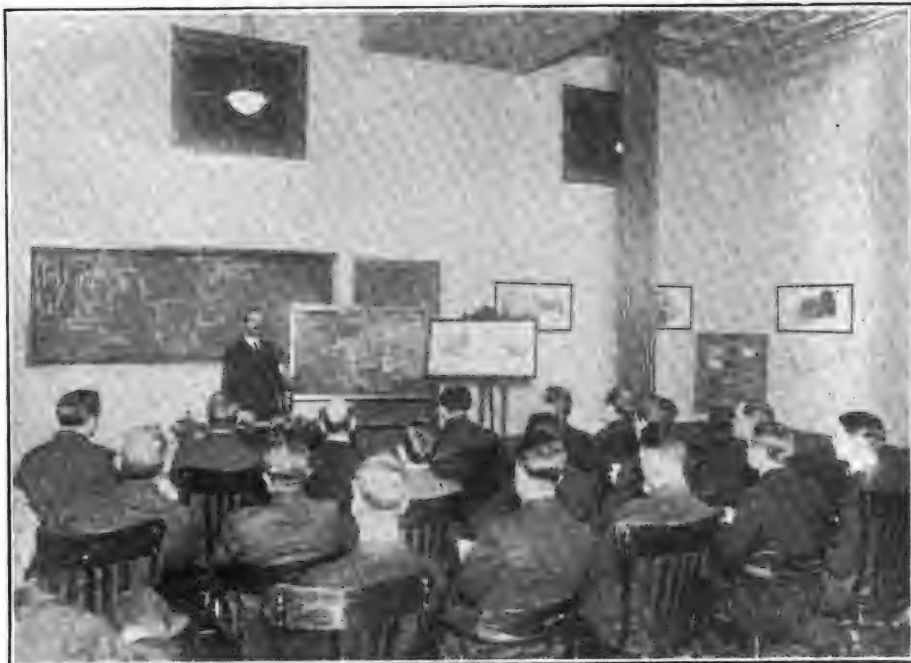
After the first lesson the practise on the anchored car is directed by a series of signs operated by the instructor, through which actual road conditions are visualized for the pupil. Thus starting gradually the efforts of the pupil are confined solely in the first lesson to an understanding of the mechanical operations, through the signs and the reasons for the performance of the operations. The instructor develops in the pupil's mind that quick reaction to sudden changes of conditions which is essential to correct and safe driving.

Aside from acquainting the pupil with the construction of his car in relation to its operation the instructions on the anchored car, the general principles governing the operation of a gasoline automobile, describing each unit in detail, and other mechanical instructions in the school course are given in a brief text book prepared and published by Bishop, McCormick & Bishop, Inc., entitled "Driving Instructions." This book is supplementary to Dodge Brothers' "Book of Information" furnished with each car. After four or five lessons with the anchored car one lesson is devoted to the lubrication of the car, and in this lesson the entire oiling system is explained.

Road Work in the Duplex Control Car.

The pupil is given his lessons on actual driving and road work in the duplex-control car, perfected and patented by Bishop, McCormick & Bishop, Inc. This car is so designed that all the essential parts of its operating control are duplicated. It has two steering wheels, two sets of clutch and brake pedals, two accelerators, arranged so that the control operated by the instructor dominates that used by the pupil; thus it is possible for the instructor at any time to instantly take control of the machine without reaching over or interfering in any way with the pupil.

The duplex-control car permits the instructor to start road instruction under actual operating conditions, and instead of seeking unfrequented streets he may hunt out the busiest ones, going through congested traffic with safety, doing everything that will be necessary for the pupil to do himself when his instruction is completed. By this method the pupil learns to operate the car and acquires experience at the same time without risk, nervous strain or delay. After a few lessons on the duplex-control car the pupil is ready to take final instructions



Class Room of School: New Owners Listening to a Lecture Being Delivered by the Mechanical Engineer Instructor.

in driving his own car. It is surprising to see how his previous instructions have become second nature to him. He even ventures into congested traffic, with the dangerous risk reduced to the minimum.

The School for Owners.

The Bishop, McCormick & Bishop, Inc. school work is in charge of a mechanical engineer who is also an experienced instructor. The class room is equipped with a complete stripped chassis and a separate sectioned engine showing all the working parts. Every unit of the car is mounted separately—for instance, the gearset and the final drive and differential are mounted with the gears exposed and the proper connections made, so that its operation is plainly shown. Carburetor action and gasoline feed are explained with the aid of glass-paneled working models. The electrical apparatus is thoroughly treated, including the care of the storage battery. The lessons are designed not only to explain the construction of the car and the mechanical features that make its operation possible, but also to impress upon the owner's mind the things that are likely to happen if the car is not properly operated and maintained.

Driving instructions are furnished without charge to one driver for each car purchased. Additional drivers are instructed at the rate of 75 cents for indoor lessons, 75 cents for road lessons in the pupil's car and \$1.50 for road lessons in the company's car. A nominal charge of \$7 is made for the course in care and maintenance, which is covered in seven lessons, which are supplemented by a set of preliminary instruction pamphlets for home reading.

The company has lately added a course in shop practise to keep the users of their commercial cars in touch with mechanical methods of upkeep, which have been standardized in their own commercial car department.

Their educational department has been instrumental in creating many new car owners. Their methods of instruction are so practical that the most timid person is readily convinced that by such training he can become a better driver than the average car owner.

The Company's Policies of Efficiency.

Clifford M. Bishop is the secretary and general manager of Bishop, McCormick & Bishop, Inc. He impressed the writer as a forcible character; indeed, as a man of exceptional attainments and of great initiative. Many of the ideas from which a working system was evolved emanated from him. Those ideas were not mere flights of thought, but after they were accurately balanced in the scales of judgment by the other members of the company at the counsel table they were approved as practical of incorporating into a workable system from which they have obtained an efficiency in service and also a profit. Mr. Bishop is also the advertising manager and his work in this line stamps him as a genius. Considerable of this company's success is attributable to his ability in molding public opinion; his advertising work is truly educational and a treat and inspiration to those who receive it and appreciate its real value.

Here are the company's policies of efficiency, as summarized by Clifford M. Bishop:

"Discussing particularly our standard practise and standard time charge repair system, we would say that it represents the result of 13 years of study of the repair problem. We have gone through the business from almost every angle. We have operated a garage, handled two or three lines of cars, and we have tried almost every new idea and new experiment that has come out in the business, and we have arrived at certain fundamental conclusions which form the basis of our business, and upon which everything else is predicated.

These conclusions are:

"First: That it is not profitable to operate together a sales agency and a garage, if there is any possibility of extending the sales end of the business to a sufficient extent to bring the financial return warranted by the investment.

"Second: That it is not nearly so profitable to handle two or three lines as it is to handle one line with sufficient territory to secure a satisfactory return.

"Third: That the simplification of a business for one good line of cars and the necessary departments to meet the moral and material obligations to purchasers produces an increase in profit that greatly exceeds any profit that might result in the handling of two or more lines of cars, or from the introduction of other departments that interfere with the efficiency of the whole.

"Fourth: That it is not possible to operate an automobile business profitably except on a cash basis.

"Fifth: That it is not possible to operate it on a cash basis satisfactorily unless the business is so organized that the price of work based on the exact knowledge of the cost of materials and supplies, can be told to the customer in advance.

"Sixth: That it is possible to apply the principles of manufacturing efficiency to the repair work, and that the return in profit to the dealer and in satisfaction to the customer warrants any expense necessary in the installation of a system.

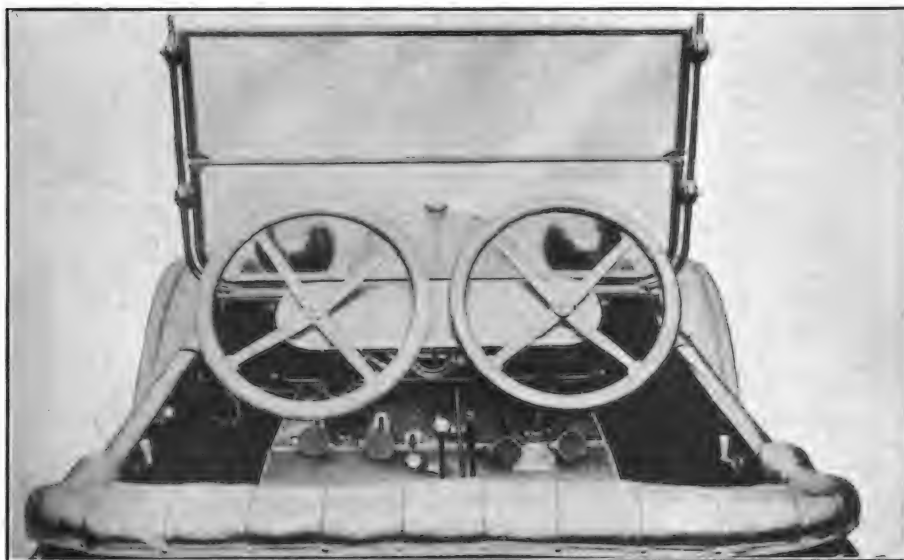
"Seventh: That unless the sources of conflict with customers and the arguments and loss of time involved in such conflicts are eliminated from the business it cannot be truly successful."

Conditions Prevailing on Basis of Variable Charges.

Bishop, McCormick & Bishop, Inc. have adopted the flat rate of charge for various operations of repair work, such as cleaning engine of carbon, grinding valves, overhauling the transmission gearset or adjusting and repairing the differential gears, etc. (See example in illustration, Fig. 1.) They have standardized these operations and their thoroughly tried out cost system has enabled them to establish a standard cost on each operation, from which they make up their price to charge the customer.

Mr. Bishop explains as follows the conditions that obtain where repair work is not done on the flat rate:

In the first place the customer comes to the repair department, troubled with a noise in his motor. He wants to have



The Duplex Control Car Used by Demonstrator to Check Up Driving Efficiency of Pupil.

the noise eliminated and the shop foreman estimates roughly what it will cost to eliminate the noise. He generally makes his estimate high enough, or attempts to make it high enough to cover any contingencies. He does not know at the time what workmen will work on it and he is gambling in his estimate, both on the conditions that may exist in the motor and on the ability, manner and method of the man who does the job. We will say that he tells the customer \$100 and when he goes into the work he finds it will cost \$150. The customer comes in prepared to pay \$100 and when he finds he has to pay \$150 he is probably not prepared mentally or financially to meet the obligation. The result is quite likely to be a breaking down of the cash-on-delivery system in this particular case and the assumption on the part of the dealer in the gamble of \$50, or it may be that the job only costs \$85 and the customer has been told that \$100 would probably cover the job. He is quite likely to leave with the impression that he has been robbed at \$85 because mentally he figured the job at \$60. It is easy to see how much unnecessary time it is going to take the foreman or service manager and his assistants in handling the case whatever the charge is, which represents the dealer's side of it. Now as to the customer's side: He has left his job with the repair shop and he has no definite idea of how the shop is going to do the particular job, or who is going to do it, and they have no idea of how many demands may be made on them for small units of time in emergencies.

It may be necessary to pull a man off this job and put his time on another job temporarily, or to have him leave what he is doing and assist somebody else. There are no adequate provisions made for keeping track of the time lost in that way, therefore, the customer's job charge is quite likely to represent so much time actually put on the job and some time spent sweeping the shop or assisting other mechanics, moving cars and doing any one of the many things that arise

in the operation of the ordinary repair shop.

It is also quite likely, too, that the reason the charge was \$150 on the job is because the mechanic did not do the job right the first time and it had to be done over again. Of course the customer does not know this, but the service manager has employed the best mechanics that he can secure and the customer must pay for the time they spend regardless of whether it is spent efficiently or not. Therefore, he

feels entitled to the \$150 and he is going to get it. Let us consider one other angle, the proprietor in the business. Assume he is earnest, honest and anxious to please and that he cares a great deal about the good will of his customers. How can he possibly check up what a service manager is doing and on what possible basis can he decide whether his shop has been fair to the customer or not? How can he adjust a dispute except on the principle that the customer is always right, and if he adjusts disputes on this basis how can he possibly avoid a tremendous financial loss in his service department, or if he backs his foreman up and insists on the payment of the charges, how can he avoid an equally great loss of good will? This is the briefest kind of a summary of three different angles on the question. Now let us take them on the other basis:

Standard Time, Method and Charge.

Let us assume that the shop is being conducted on the standard practise, standard charge basis. The first thing to be considered is the overhead expense of the shop, including the testing of cars before work is received and testing again before delivery is made to the customer, the necessary clerks and office help to keep track of the system, cleaning up of the shop, moving about of cars and the doing of any chores that are necessary, these functions being entirely eliminated from the mechanics. Having decided what this overhead expense is it may be divided over the number of working hours of the shop, and when added to the average rate paid to mechanics and the profit desired per hour, we can arrive at a rate per hour which accurately represents the value of that hour of work to the customer.

Now let us consider as a second step that the shop foreman and the mechanics working on the job are entirely out of contact with the public. The receiving and the handling of repair work is accomplished by a separate organization consisting of a courteous and thoroughly competent clerk, and four or five testers,

according to the size of the business. This is what we will call the contact end of the service department. Now let us go back to the repair shop for a moment and consider that through accurate records, for a long period of time, we have been able to evolve the average cost of doing most of the operations, split up into as small units as possible, which may be necessitated by the car we are selling. Let us analyze these operations and the method and manner in which they are performed to arrive at two things: First, the average time of each operation, and second, the best method of doing that operation. Then let us develop an average time for the operation, which we will call our standard time, and a method of doing the operation, which we will call our standard method. Multiply the time by the rate per hour and we develop a standard charge for the operation.

The Standard Job and Flat Rate.
The service department of Bishop, McCormick & Bishop, Inc. also establishes what tools shall be used on the operation and they become the standard tools. They specify also what parts may be required for the operation. They use a printed form for that operation which contains each step in the operation in its proper order, each tool necessitated by each step and what parts are necessary. The combination of this operation, with several others, makes up a standard job. It is only necessary to allow sufficient time at the start of the operation for the mechanic to gather together all the tools and parts he may need and to see that the car is properly placed for him, and to add at the end of the job sufficient time to permit him to gather up the tools, clean up the part of the car he has been working on and return the tools to the tool room. They have a unit standard job printed so that when the contact end of the service department receives from the customer an order to do that particular job it is only necessary for the shop foreman to assign a man to it, who receives the printed form from the shop clerk and starts to work. There is no need of wasting any time explaining anything even though the workman may be a new one; if he can read and knows how to handle tools he can do the job and he will do it in the same way that any other mechanic in the shop would do it in approximately the same amount of time. The law of averages, of course, applies; one man may be faster than another, but in the long run the average is maintained for both customer and dealer. Every element of gamble has been eliminated from the job. If there is any waste of time or loafing or inefficiency, that becomes an item of cost for the man responsible for it, the dealer. It is reasonable to suppose, under the circumstances, that he will take due precautions to see that there is no lost time and no inefficiency, because he has burned his bridges behind him, so far as the customer is concerned, when he set a flat rate for the job. That is his evidence of good faith to the customer and is the investment he has made for efficiency.

Now the rate per hour is, of course, a secret rate and it is not a matter of concern to the customer, provided the job cost is reasonable. It might be 50 cents an hour or in the highly developed and thoroughly efficient shop it might be \$2 an hour. The customer is not concerned with how much the shop is making, he is concerned solely on what he will get and how much he will pay for it. What a wide range of efficiency this opens to the dealer? He can equip himself with special tools of various kinds that will cut his labor time materially. In fact, every time he introduces a new element of efficiency he does it with a profit to himself. He holds in his own hands all the factors of success or failure.

Easy to Collect Cash When Price is Established.
Now let us consider the customer: He comes to the service department and meets this efficient and courteous clerk we were talking about, and an exceedingly competent tester is sent out with him in his car and they ascertain what the trouble is with the car. The tester reports to the clerk and the clerk tells the customer what his car needs and how much it will cost him to fix it. The customer then may say "it's too much," and the clerk then replies "that's our charge for the work and it is the only charge that we have;" then the customer may decide whether he will have the work done or go somewhere else and

STARTED

STAMP IN

TIME CLOCK

BISHOP, McCORMICK & BISHOP, INC.

18 & 20 HALSEY STREET

BROOKLYN, N. Y.

FINISHED

STAMP IN

TIME CLOCK

Standard Practice Operation - G I - Clean Out Carbon Dodge Brothers Car.

CAR NO. _____

LICENCE NO. _____

JOB NO. _____

CUS. NAME _____

ORDER THE FOLLOWING PARTS BEFORE STARTING WORK.

I Top Water Hose. I Cylinder Head Gasket, I lb Waste and Rags on Requisition No. _____

GET READY BEFORE STARTING WORK

All Tools and Appliances Listed Below.

	ORDER OF WORK	TOOL OR APPLIANCES	FINISHED
	1 Place Car. Get Tools and Parts Ready		
	2 Drain Radiator. Take off Stay Rod	Bucket	
	36 Disconnect Carburetor. Stuff Manifold with Rag		
	4 Disconnect Wires from Spark Plugs		
	5 Take out Spark Plugs	D. B. Wrench 1145	
	6 Remove Cylinder Head and Top Hose	D. B Wrench 1146	
	7 Remove Cylinder Head Gasket		
	8 Clean off Carbon		
	45 Wipe off Valve Seats with Rag		
	49 Put Oil on Valve Seats		
	35 Turn Valves with Screw Driver to Seat Them		
	Summon foreman for inspection of valves and cylinder walls before further work is done		
	363 Blow out Manifold	Compressed Air Appliance	
M	37 Bolt on Carburetor		
	20 Put on New Cylinder Head Gasket		
	21 Replace Cylinder Head and Top Radiator Hose	(Same D. B. Wrench 1146)	
	22 Clean Spark Plugs - Adjust Spark Gap	Delco Feeler	
M	23 Replace Plugs		
	24 Connect Spark Plug Wires		
	25 Fill Radiator - Run Motor Till Warm	Bucket	
M	26 Set Up Cylinder Head Nuts		
	29 Pick up Tools. Clean up car.		

MEMO OF ASSISTANCE

TIME

WORK

MECH. NAME _____ NO. _____ FROM _____ TO _____

_____ " _____ " _____ " _____

SIGNED. _____

Mechanic In Charge Of Job.

Fig. 1—Blank Form as Example of a Standard Operation of Repair Work.



Section of the Machine Shop. A Lathe Hand Is Turning up a Bearing Carrier for An Extended Dodge Brothers Chassis and Another Lathe Operator Is Facing Off a Valve, and the Third Mechanic Is Hand-Finishing Valves That Have Been Ground with the Electric Grinder.

have it done, but either way there is no reason or hope of gain through argument. If he leaves the job and the clerk has told him \$100, he knows it will only cost him \$100, and when he comes for the car he goes out with the tester and if the car is all right he pays his \$100; if it is not all right it is made right at the dealer's expense before the customer pays the \$100, because it is the dealer's fault. What possibility is there for argument? Following out the case illustrated under the old method, let us consider when there is a noise in the car. Under standard practise Bishop, McCormick & Bishop, Inc. never accept a general order to accomplish a definite result. To illustrate, they would not think of taking an order from a customer to eliminate a certain knock or sound from his car; that would introduce a gambling element entirely foreign to practise because there are no contingency margins in the system; therefore, in a case of that kind an order would be taken and a charge made for opening up the motor to examine it and then when it had been examined another order would be taken to do specific things to the motor and they guarantee that the things they attempt to do will be done properly, but not that they will accomplish any definite result; for instance, if they found the main bearings loose they would agree to fit them at a price and that the work would be done properly and so on through the various items involved. Under the old system Mr. Bishop says he has seen orders taken to eliminate a sound from a car where the motor has been taken down and put together two or three times and the noise remained. In standard practise that may be possible, but it is extremely unlikely, in view of the fact that an examination involves

the micrometer measurements of cylinders and pistons, as well as examination of all bearings, and it is reasonable to suppose that if a proper examination is made beforehand every other possible source of trouble will be detected, and since standard practise involves the same system of inspection that is used in new car manufacturing, such for instance as the stopping of a job at a certain point until the foreman's O K has been given to proceed. It is not likely that the time will be wasted on a job, any of the steps of which have been properly done. When a customer has had his work done by this method he will not willingly go back to the old system. In such a simple operation as grinding valves, under the old system he might come in and have the work done for \$5 at one time and then the next time it might be \$8, depending on the condition of the valves and the ability of the man working on the job. In standard practise he would pay the same price both times and again the possibility of argument over various charges is eliminated.

It is easy to collect cash from the customer when he knows in advance what he is expected to pay. Even in the case where there is a condition inside of the motor which cannot be ascertained until it is opened; when it is opened a definite charge is given him in advance for the work; therefore, there is no reason why he should not be prepared to pay for it.

Two Classes of Mechanics.

The dealer knows at all times how many working hours there are in a shop. He knows how many working hours are sold and he knows how many working hours for which he receives pay and it is a very simple matter for him to detect any increase in the number of

wasted hours, such as are involved on a job being turned back by the tester as being not properly done, or a job brought back by the customer because work was not properly done; therefore, it is a very simple matter for the service department to keep track of the shop.

There is another variation in standard practise which means considerable in the efficiency of the shop and that Bishop, McCormick & Bishop, Inc. designate as machine shop practise. Every one in the trade knows that there are two classes of mechanics. First, machinist mechanics. Second, ordinary or automobile mechanics. A machinist mechanic is a mechanic who is graduated from machine shop practise and is, therefore, thoroughly trained in fine work, such as fitting of bearings, etc. They have found that they could introduce new elements of efficiency by having all motor work done in the machine shop by machinist mechanics. On jobs of this kind the automobile mechanics become merely assemblers. This introduced considerable saving in time and also an added element of surety that had not existed before.

Incoming and Final Tests of Cars to Be Repaired.

The service department of Bishop, McCormick & Bishop, Inc. does not rely on the customer's report on certain irregularities to be adjusted or units to be repaired, but in every instance they give the car their "incoming test" to ascertain whether there is anything other than that reported by the owner which should have attention. All the information of this "incoming test" is incorporated in the tester's printed blank form, here reproduced:

Form No. 38
BISHOP, MCCORMICK & BISHOP, INC.
Brooklyn, N. Y.
Inspector's Report.
Incoming Test.

No.	W. E. McGuirk.
Speedometer.	1567 President St.
Record, 9690.	Tel. Bedford 5842.
Motor No. 102,259.	
License No. 27,654.	
Inspector, Monahan.	

Grind valves.
Tighten starter chain.
Equalize foot brakes.
Tighten drag link (2 ends).
Tighten steering at connection.
Put new felt washer in right front wheel.

The process of testing is very simple. Their tester rides out with the customer and he shows the tester the trouble of which he complains. As soon as the inspector has located the trouble he spends the balance of his time on the test in the attempt to discover if there is anything else wrong with the car, and when the car is brought back to the service station he also examines it, going over it very thoroughly. He then makes a complete report of anything he finds wrong to the service clerk, who takes the case up with the customer on the basis of the inspector's report. Here is a very important step and safeguard in their standard practise system. It quite frequently develops that the customer does not want anything done to his car beyond the correction of the particular condition he designated. Of course they follow the

customer's wish in this respect, but the tester's report is affixed to the repair job ticket. It also quite frequently happens that when the final test is made, which is for the purpose of showing the customer that the condition of which he complained has been corrected, that the customer will call the final tester's attention to some condition in the car which did not exist when the car was brought into the service station, and it is invariably developed by reference to the original tester's report that the customer's attention was called to this condition and that he refused to have the work done; or it may be that an interval will elapse and then the customer will come in and bitterly complain about his car on account of the trouble he is having, and reference to their tester's record will show him that he might have avoided the trouble if he had permitted them to do some minor precautionary work to which their tester had called his attention.

There are several other checks of similar kind which Bishop, McCormick & Bishop, Inc. keep on all the cars they have sold, which are of great assistance in the handling of unreasonable complaints. These are not methods that they could allow to be published, but they declare that it is an easy matter for any dealer to develop ways of deciding, as for instance, when a customer comes back to him and says he has run his car only 200 miles, whether he is not slightly mistaken in his statement and has not, in fact, run it 1500 or 1800 miles. Bishop, McCormick & Bishop have found that it is only necessary to catch a customer wrong once in a statement he has made in order to make him an entirely satisfactory and well behaved customer thereafter. By this they do not mean that they are looking for trouble of that kind, but it almost goes without saying that it is utterly impossible to be fair to everyone in service work unless some standard of judgment of complaints is established, nor is it wise to let one or two unscrupulous owners spoil your faith in hundreds of owners who ask only what is fair and right and with whom the carrying on of any business transaction is surprisingly simple and easy.

Saving Time and Labor with Special Tools.

Bishop, McCormick & Bishop, Inc. are enabled to cut down the time on various operations of repair work by using a number of special tools of their own design. This is another angle of their efficiency by which they have been enabled to adopt standard practise on various operations. The utility of these special tools is sufficient to attract the admiration of all practical automobile mechanics, as the possibilities of larger profits through the use of special tools are so much greater. This can be illustrated by a valve grinding job. Let us assume that a valve grinding job done by the hand method costs \$8, that the time consumed in grinding these valves is about six hours; having established this rate of \$8 for the job, by way of comparison, we substitute an electric valve grinder and cut the grinding time from six hours to less than one hour, but leave the charge to the customer the same. On the basis of this greatly increased efficiency the service department of Bishop, McCormick & Bishop, Inc. argues that if their rate per hour were \$1, five hours of labor would be saved, although an additional item of expense would be added by the use of electric current and the wear on the valve grinder. Then they assume, for example, that the cost of grinding a set of valves would be \$2, which leaves three hours, or \$3, saved on the job, which can be expended toward paying for the valve grinder, and as soon as it is paid for the dealer can either keep the extra profit himself or he can share it with his workmen or divide it between himself and his customers. They hold that this phase of shop work is an angle of efficiency in standard practise, which lends a charm to service work which never existed before. Its possibilities are tremendous. The proper wrench for a particular operation will often save 15 minutes to an hour's time in the handling of it. The time and labor saved by using the proper appliances for lifting out bodies, jacking up rear axles, lifting out motors and delivering them to the machine shop make up an economical efficiency that increases the profits of the dealer.

The special tools described below were designed and perfected under the direction of the capable service manager of Bishop, McCormick & Bishop, Inc. Joseph Kenney, who is a practical machinist and has been connected with the automobile business for the past 12 years. Nearly all of these tools can be used on repair work on nearly all makes of cars:

1. Gauge for measuring the oil dips on the connecting rod and the oil level and the combination splash and force feed system used on Dodge Brothers car.

-2. Another tool that has saved a great deal of time in cases where the outer bearing race of the drive pinion bearing has broken and it is impossible to extract it in any other way.

3. A special vise to hold the bearing cap or connecting rod while the bearing is being scraped. When the ordinary type of vise is used for this purpose it is quite likely, unless the mechanic is exceedingly careful in tightening the vise sufficiently to hold the cap, it will also press it out of shape. This vise contains two pins, which fit into the holes in the cap or connecting rod and hold it in this way.

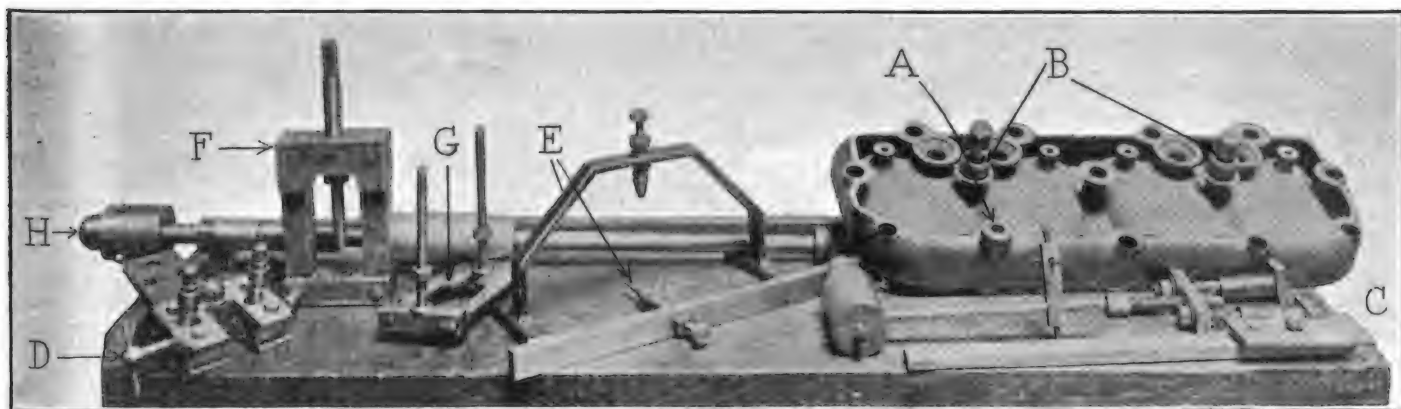
4. There is another tool, a jig, devised for use on the earlier cars where bolts were used instead of studs; quite frequently the thread in the cylinder that the bolt fitted into would become stripped. The jig is used to redrill and retap these holes.

5. A special yoke puller to pull the universal yoke off the transmission shaft.

6. Another special tool is a clutch spring compressor to hold the spring until thrust plate has been removed or replaced.

7. Another tool that has been exceedingly helpful is a gauge to test the trueness of the brake drums in adjusting brakes. This is one job that is quite likely to be poorly done in most of the shops.

8. In connection with brake work they also use a jig to hold the brake lining so that it can be drilled, countersunk and riveted in one operation without any danger that the brake band will be hammered out of shape, which is quite likely to be the result if this work were



Special Tools: In the Upper Right Hand Corner Is the Special Jig Used to Retap and Redrill the Cylinder Bolt Holes; A, Removable Guide for Drill; B, Sleeve and Taper Stud to Center Jig; C, Tool Alongside Cylinder Head Used to Test Brake Drums to Ascertain Trueness; D, Special Vise to Hold Connecting Rods and Bearing Caps; E, Gauge to Measure Oil Dip on Connecting Rods and Oil Level in Pan; F, Press Used to Press Out Old and in New Bushings in Steering Arms in One Operation; G, Clutch Spring Compressor; H, Special Puller Tool Used for Pulling Out Outside Bearing Cup and Torque Tube.



The Foreman's Blackboard, Showing Repair Jobs Under Way.

done on the vise.

9. A special set of clamps to hold the valve springs compressed, thus eliminating the necessity for valve lifters.

10. Another time saver is an alignment rod for quickly lining up front wheels.

In addition to these special tools of their own development, they use Weaver jacks for rear axle work, special adjusting stand for motor work, which holds the motor in the position desired, electric valve grinder and drills, jacks, clamps and brackets for the removal and installation of motors, traveling hoists and portable hoists and every other form of standard equipment that will save time and labor.

All tools and equipment are given out to mechanics on checks and a report is immediately made of any damage to them, so that they can be replaced immediately or repaired.

There are other possibilities of modern methods and equipment, which do not necessarily mean increased profits so much as they are safeguards to already existing profits. This side of shop efficiency, of course, should include proper testing and inspecting, but should also include accurate measuring devices, gauges, jigs and dies which will make certain that every operation performed will be absolutely correct and satisfactory, so that there will be no comeback on the shop, because whatever system you may use in your shop the work must be properly executed, and if it is not properly done the first time it must be done over a second or even a third time until it is right. That is the unquestionable obligation of the dealer to the customer.

The Utility of the Foreman's Blackboard.

Since in their system they have broken each job into the smallest possible component operations, they frequently find that the small individual operations run through a great many jobs; for

instance, the process of removing a cylinder head on a Dodge Brothers car is exactly the same in a carbon cleaning job as in a valve grinding job, therefore, the start of these two jobs is identical. Also the operation is the same in the examination of the piston rings, etc., and since the total time of the small operations on a job makes up the total time of the job itself, the minute a job is received they know three things about it: First, the nature of the work; second, the average number of hours the work should take; third, the charge made for the job. Consequently, in the handling of the work in the shop they have rigged up behind the clerk's desk several blackboards that are ruled to show: First, the job number; second, the location of the job, for every space about the shop is numbered; third, the customer's name; fourth, the mechanic's name; fifth, the time and date at which the job was started; sixth, the time and date at which it should be finished. To illustrate the working of the blackboard, if the shop employs 30 men eight hours a day, it has 240 hours of labor a day to sell. If, on the other hand, it is carrying over 140 hours of uncompleted work, it is perfectly apparent to the receiving clerk and shop foreman that only 100 hours of new work can be handled that day. Thus the shop clerk knows in advance how long each job will take and the shop clerk, the shop foreman and his assistants know in advance when each job should be finished; therefore, the question of promising work and delivering it on time is greatly simplified, for the shop foreman and his assistants have only to glance at the board to know which jobs should be finished, and it is their duty to see that these jobs are finished on time, both to save the customer from disappointment and the shop from the loss of a job. Therefore, it is the practise of the supervising mechanics and foreman to get around to every job

at least an hour or two before it is due to be finished, and if there is any likelihood that the mechanic will be behind on his schedule to finish the job, then they must turn in and help him to get it finished on time.

This system of blackboard schedule keeps constantly before the responsible heads of the shop their obligations to the public and the firm, and it is a rare occasion for anyone to disappoint on the scheduled delivery of a job and a very rare thing for the firm to have to stand a loss on a job because an excess of time was consumed in the work.

Above were mentioned the inspection points in each job. They are generally placed on each job ticket (see illustration, Fig. 1), so that an inspection may be made before the work is covered up. For instance, in cleaning carbon there is an inspection required as soon as the carbon has been cleaned off and the valves have been seated. This inspection is to make sure that the cleaning has been properly done and that the valves do not need regrinding. If the valves should need regrinding it should unquestionably be economy for the customer to have it done while the head is off. Bishop, McCormick & Bishop have proved to their own satisfaction that these inspections have saved thousands of dollars to them and their customers in the course of a business year.

The Electrical Department.

The electrical department of the service station of Bishop, McCormick & Bishop, Inc. is installed in a room separate from the main work shop. This department is a particular example of their specialization. It was formerly their practise to have any one of several mechanics undertake electrical work, but they found that much better work could be obtained by having the best man specialize on that kind of work, because electrical work requires special equipment and machinery, from which satisfactory results cannot be obtained if six or seven men are working with it and the responsibility for its working efficiency is divided, nor can the same standard of uniformity of work be obtained under such conditions. On a standard practise it requires the same flat rate system throughout all departments, so they decided to eliminate electrical work from the repair shop and established a separate department for this class of work, completely equipped. They found it possible to handle all the electrical work that comes to them with one good electrical mechanic and a helper. This department has brought about several very satisfactory results; one is that they retain a profitable revenue-producing department, instead of passing the work to some outside concern; another advantage is that they eliminated for customers all the waste time and expense involved in sending out work and getting it back promptly. A car can be brought into their service station for combined motor and electrical repairs and the electrical work can be going on in the electrical department while the other work is being proceeded with in

the repair department, and thereby there is very little chance of any holdup in the delivery of the work. They are enabled by this policy to keep within their own organization a man thoroughly capable of handling every electrical difficulty that may arise in the plant or in the use of their own cars and electrical equipment. In this department they handle all kinds of work on generators, magnetos, electric horns, etc., but they do not undertake any battery work, as the Willard Storage Battery Co. has an established service arrangement which gives the owner of a Dodge car free service in having his battery registered as soon as he receives his car and thereafter inspected at frequent intervals.

The C. O. D. Repair Order Form.

The size of this blank form is 11x8½ inches and is in triplicate, with two holes punched at the left for loose-leaf filing. The heading of the firm and "C. O. D. Repair Order" are the lines prominently displayed at the top in the centre. To the left of this main heading are these lines and blanks: Speedometer Record, Motor No., License No. To the right are No. R., Date, Name, Address, Telephone. Along the left side of the blank space for the particulars of the order are printed the conditions reproduced below, which the customer assumes when giving his order for work, and at the bottom is this line, "I hereby authorize the above work subject to the conditions printed on the face of this order blank," followed by a blank line for the customer's signature. On the back of this original order is a ruled form headed "Actual Working Time," with the repair order number duplicated. This original order form goes to the billing department to figure the total time charge, together with the additional charges for material and parts which are recorded in a ruled form on the back of the second sheet of the repair order. On the second repair order sheet the main heading is eliminated, with this substitution: "The repairs, as per instructions on original copy of the order, are hereby accepted as complete and satisfactory and the charges for same, amounting to \$....., have been examined and approved by..... Customer. Date 191..." On the second sheet, occupying the space used for the conditions on the original sheet, are these lines: Inspected by, received by, promised for, with blank lines for the day and time; foreman's signature, final test by, with blank line for tester's signature, delivered by and blank line for signature of man who delivered it.

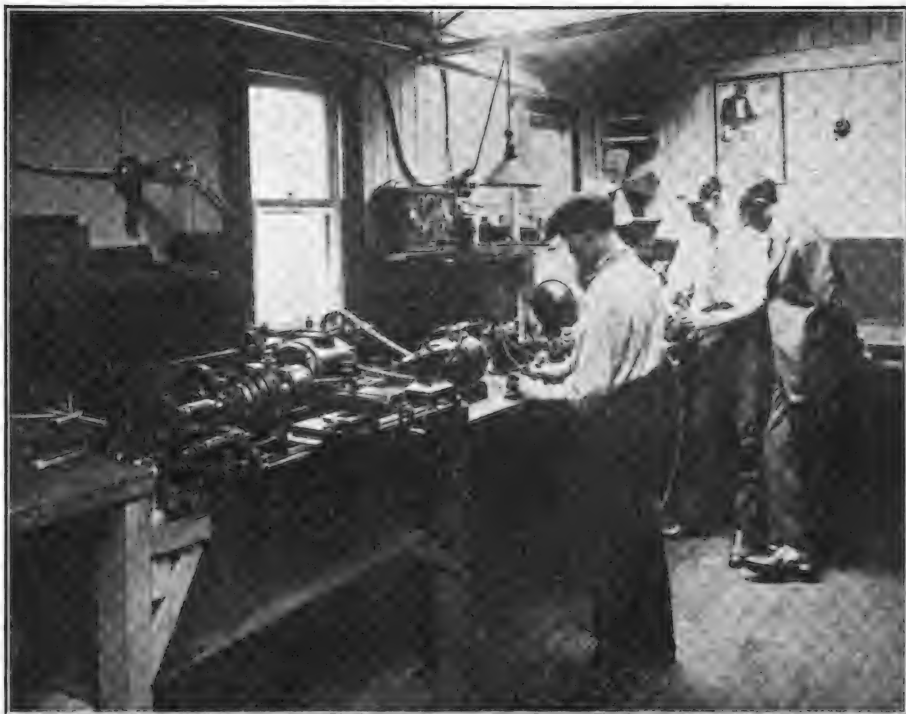
Conditions Printed on Original Repair Order.

All repair work is payable in cash on delivery.

All orders must be explicit, clear and definite.

Telephone orders are accepted only at customer's risk.

Promises made as to the delivery of work are dependent on conditions beyond our control. It is expressly agreed that this job is not to be delivered until it is fully completed as ordered.



The Completely Equipped Electrical Department.

Car must be removed immediately upon notification that work is completed or the car may be placed in storage at owner's expense.

It is further expressly agreed that Bishop, McCormick & Bishop, Inc. shall not be responsible for loss by fire or for loss or damage to cars, parts, articles or equipment, loose articles, furnishings or accessories by theft, accident or otherwise, unless a specific agreement to that end is made in writing, nor for detention or delay in delivery of cars, nor for consequent damages or loss of use of said car however caused. The receipt of the car at any time by the owner or his representative shall constitute a waiver of all claims for loss or damage thereto.

Cars are examined, tested and driven by our men solely at owner's risk.

Remove your switch key when you leave your car.

The third sheet of the repair order is of Manila cardboard and has only the heading of the original order sheet printed on it, and below this, blank space in which is duplicated the particulars of the repair job. The first sheet of the repair order is printed on golden rod bond and for the second sheet white bond paper is used. The object of the third sheet printed on Manila stock is that it is used to place on top of the other two sheets and forms a cover as well as a summarized index, for ready handling and reference when placed into the loose-leaf file.

The C. O. D. repair order form is simple and readily understood. The customer reads the conditions under which the firm accepts his order and by his also agreeing to these conditions there will be no misunderstanding on that score when the work is completed. The customer understands in advance that the terms are strictly C. O. D. and when

he comes to take away the repaired car he signs the acceptance of the job and price as satisfactory and pays his bill on the spot, with all misunderstandings as to what he ordered and all chance for complaint about the charges eliminated.

Other Forms That Make Up the System.

They use a simple repaired car release form, which is signed by the service manager and authorizes the foreman of the shop to release the car.

Their car record form is used to keep track of the movements of the cars they are operating in their own service. It is arranged so that they time the start of the car from their service station and the report contains at that time simply a statement of where the car is going, and upon the return of the car the operator stamps the time he returns and reports where he had gone, and, if possible, what streets he passed over. This may seem needless detail at first sight, but Bishop, McCormick & Bishop, Inc. have frequently found that where a great number of owners are operating on their dealer's license plates, that law suits may be avoided, so far as they are concerned, through their ability to eliminate their cars from having been in any accidents which their car records do not show. This form contains a space for a report of anything that happens and their men know that the report of an unavoidable accident will not get them into trouble with their employers and that it is necessary that the firm should have such a report in order that they can carry out their function under their insurance policy.

They use a requisition for parts or outside repairs, which is made out by the mechanic before starting work on any particular job, so that he will have immediately available every part needed on the job. Outside repairs cover such

items as radiator, tire and body repairs and similar work they do not do in their own plant. These are all ordered from the parts department. In the sale of parts they use the ordinary triplicate form of cash ticket and a much larger form of charge ticket, because their charge sales of parts are invariably to their associate dealers and they require a larger sheet.

In keeping track of their stock record they use the perpetual card inventory system in which they establish the maximum and minimum supply of each part. When they have sold down to the minimum they immediately order up to the maximum. In that way an adequate stock of parts of all kinds is continually maintained. The form is ruled so that in the left column they receive, in the middle column they balance, and in the column on the right they deliver; there-

Clifford M. Bishop, secretary, and John McCormick.

Editor's Note: In the August number a very interesting article on the used car and truck and commercial vehicle departments of Bishop, McCormick & Bishop, Inc. will be published. Their methods of using extension units with the Dodge chassis and the system they use to regulate their used car department will be described and illustrated in detail.

“GETTING MORE MILES FROM YOUR GASOLINE.”

The above caption is the title of a booklet issued by the Eccolene Co., Detroit, Mich., manufacturers of Eccolene, a preparation which is mixed with gasoline to increase its qualities of combus-



Section of the Parts and Supply Department.

fore, it is a constant process of subtracting the right column from the left in order to show the balance on hand. These records are handled exclusively in the parts room by a clerk who has no other function than the maintenance of the stock records and making out requisitions for supplies to bring the parts department up on any particular part, from minimum to maximum. They also use a simple bin card to check each compartment or shelf in the parts room. They also have a requisition form used by all departments in requesting the purchasing department to order for them anything that they may need for their departments. In fact, their entire system is the most complete and practical the writer has ever seen. Bishop, McCormick & Bishop, Inc. have 140 employees. The members of the corporation are: Eli H. Bishop, president; Burton T. Bishop, vice president; John McCormick, Jr., treasurer;

tion and improve engine efficiency by the practical elimination of carbon. The manufacturers made a test of Eccolene, using 10 new six-cylinder cars, which left the factory at Detroit and were driven to New York City. At Bellevue, O., Eccolene was added to the gasoline and used for the remainder of the trip of 651 miles. The results of the test are presented as follows: From April 24, 1918, 8 a. m., to April 26, 1918, 9 p. m.:

ECCOLENE TREATED GASOLINE.		
Car No.	Gasoline Consumed	Miles Per Gal.
1	59½	12.6
2	50	15.6
3	55	13.7
4	53	14.2
5	51	14.8

Average miles per gallon.....14.2
Gasoline consumed.....268½ gallons

CARS USING PLAIN GASOLINE.

6	75	10
7	62½	12
8	56	13.4
9	68½	11
10	64	11.5

Average miles per gallon.....11.5
Total gasoline consumed....326 gallons
Gasoline saved on trip by use of Eccolene—58 gallons.
Increased mileage—23.4 per cent.
Cost of Eccolene, 3 1/3 quarts at \$7 per gallon—\$5.83.
Saving in gasoline, 58 gallons at 26¼ cents—\$15.25.
Saving less cost of Eccolene—\$9.42.
Piston of cars using Eccolene were almost free from carbon; the others were considerably carbonized.
The Edward A. Cassidy Co., of New York city, has been appointed distributors of Eccolene for the entire country.

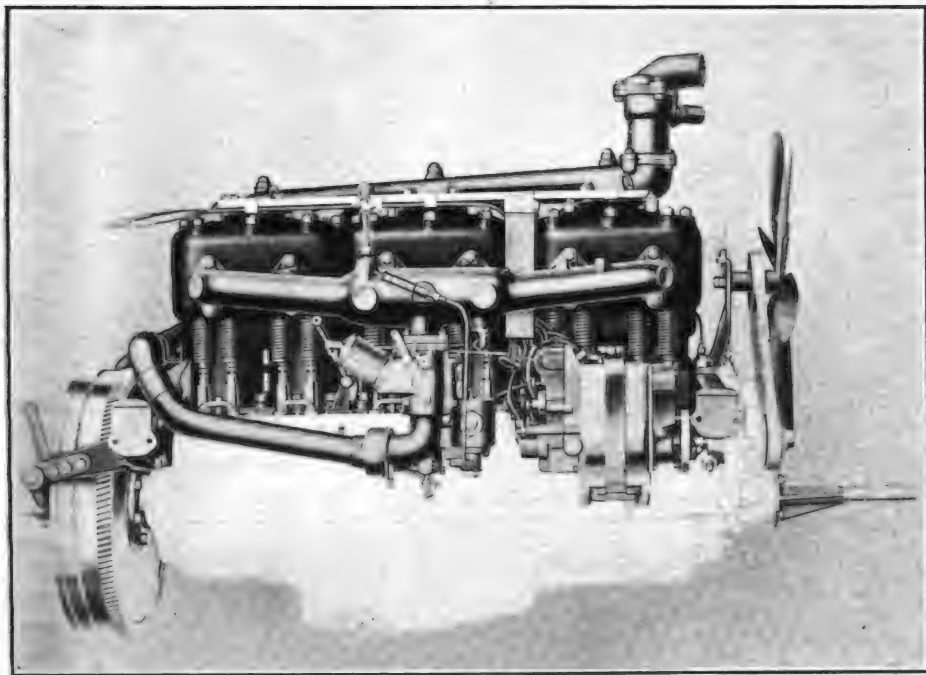
PROGRAM FOR SEMI-ANNUAL MEETING OF THE A. G. M. A.

An interesting program is being arranged for the semi-annual meeting of the American Gear Manufacturers' Association, which will be held at the Onondaga hotel, Syracuse, N. Y., Sept. 19, 20 and 21. A portion of the program has been announced as follows: "Priority" by Charles A. Otis of the priority committee. "What Is the Possibility of Women Becoming a Permanent Factor in the Gear Industry?" W. H. Diefendorf. "Trade Acceptances," C. E. Crofoot. "The Outlook of the Steel Supply," C. E. Stuart, secretary and treasurer of the Central Steel Co., Massillon, O.

THE GEORGE D. BAILEY CO. WILL BUILD A NEW PLANT.

Slightly more than a year ago the Geo. D. Bailey Co. of Chicago was organized for the purpose of marketing the Bailey ball thrust bearing for Ford and Chevrolet 490 cars. This bearing was to replace the flat thrust washers that take the gear thrust at the left side of the differential and which because of their flat surface produce friction and wear thin, causing the gears to unmesh. The great popular demand for a bearing of this type is evidenced by the fact that in just one year's time the Bailey company has been forced to move from their previously small quarters and build its own modern factory. The new plant, located at 4500-06 Ravenswood avenue, Chicago, is equipped with \$75,000 worth of the latest type of machinery for manufacturing not only the Bailey ball thrust, but the new Bailey product, the R C magneto coupling for trucks, tractors and passenger cars. The arrangement of the new factory is such that the company can turn out its products economically and on the highest efficiency basis, placing it in a position to manufacture other products which it has in mind.

Pierce-Arrow "Series Five" Passenger Car Model Has Dual Valve Engine



Intake Side of the Pierce-Arrow 48 Horse power Dual Valve Six-Cylinder Engine.

The Pierce-Arrow Motor Car Co. of Buffalo, N. Y., has earned and enjoys a reputation in the motor car industry that has given its product of both passenger cars, as well as trucks, singular distinction throughout the world. Pierce-Arrow automobiles have been developed along tried lines and changes in body lines or mechanical design have been made only after careful and exhaustive tests, a fact which makes any announcement of the incorporation of radical changes in their models take on exceptional importance in the industry and is a matter of great interest from an engineering viewpoint as well.

With these facts in mind it was natural to expect that the announcement of the new Pierce-Arrow "series five" with dual valve six-cylinder engines was accompanied by the statement that this type of engine was being adopted after long and thorough tests and trials had established its efficiency, as the Pierce-Arrow policy of building the best possible motor car and then fixing the price is adhered to strictly.

Production, however, of this type of engine has been confined to the 48 horsepower motor, as the manufacture of the other two, the Pierce-Arrow 38 and 66 horsepower, have been discontinued until after the war.

"The tendency today is to demand better direct drive performance from passenger cars than ever before," the announcement states. "It therefore has become necessary to obtain the utmost efficiency from our engines. The Pierce company have been experimenting for

years in order to improve the horsepower output of their engines. They have built various types of six, eight and 12 cylinder engines and the result of these experiments has been to convince us more than ever that for passenger car requirements the six-cylinder engine is preferable to any other type.

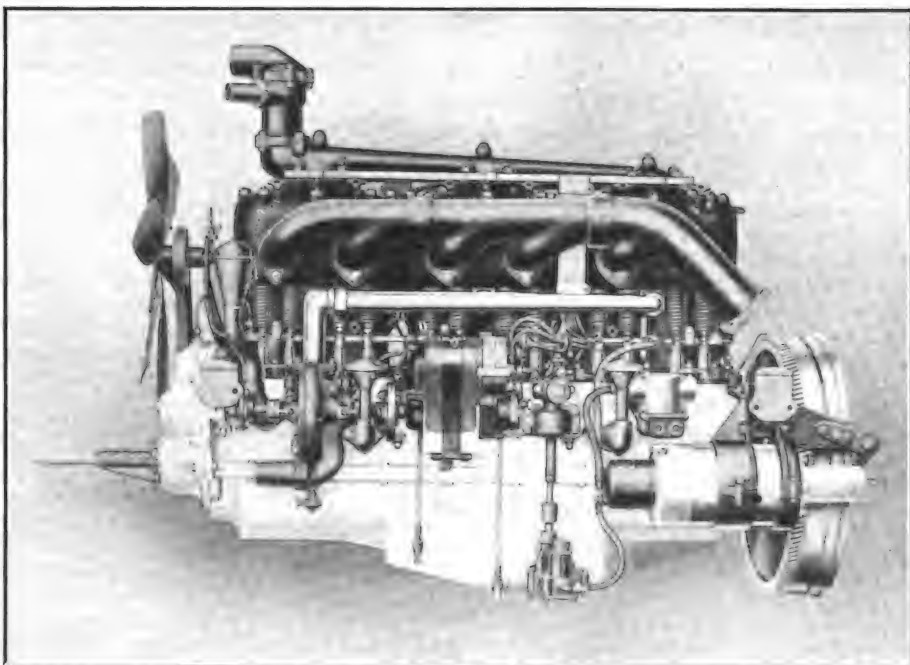
"The greater power developed in some of the above engines, especially at the higher speeds, indicated that this was

due almost entirely to the large sized valves employed compared to cylinder volume, this insuring a very high volumetric efficiency. In order to equal this condition in our 48 horsepower engine with its $4\frac{1}{2} \times 5\frac{1}{2}$ cylinder, we found that it would be necessary to use a valve three inches diameter with a lift of three-eighths inches. This is as high a lift as it is possible to use and retain reasonably quiet valve action with large diameter valves. This size of valve is, of course, prohibitive because of noise due to the heavy spring pressure required, and the tendency to warp out of shape. The standard practise is not to exceed with single valves, a throat diameter half the cylinder bore—this would give a valve $2\frac{1}{4}$ inches diameter for our 48 horsepower engine. This is practically the size we have been using in the past for this engine. We did all we could to obtain more power from this engine with this size of valve, but without success, and we decided to try double inlet and double exhaust valves in this same sized engine. These valves are $1\frac{1}{2}$ inches diameter in the throat, with three-eighths inch lift, giving the same area as a three-inch diameter valve with three-eighths inch lift.

"With this arrangement of valves on a T head cylinder it was necessary to adopt detachable heads. The results we obtained in increased horsepower and speed exceeded our anticipations.

"We also found the engine ran cooler—the valves being so small warped less, and therefore seldom require to be

(Continued on Page 49.)



Exhaust Side of New Pierce-Arrow Power Plant, Showing the 12 Valve Springs.

Reports of Activities In the Motor Industry

The Clark Equipment Co. plant at Buchanan, Mich., which is designed to have high industrial efficiency, was originally operated by two concerns, owned by the same interests, and when the units were designed one of the main objects of the owners was to afford every condition and facility that would be essential to the convenience and comfort of the employees, as well as insure the largest degree of manufacturing productivity.

The buildings were constructed to be thoroughly lighted, heated and ventilated; sanitation was given careful attention, the workers were safeguarded against dangers, and the arrangement of the tools and equipment was such that labor and time could be economized so far as possible for engineering science to devise. In addition, the companies beautified the grounds of the works, locating trees

men and women and the usual apartments required in such structures. The building is well lighted and ventilated and the furnishings are artistic. Included in the equipment is a moving picture outfit. The auditorium is now available for gatherings of different kinds, with weekly entertainments, one of the features being display of moving pictures educational in character, all of which are for the benefit of the employees of the works.

The McCord Mfg. Co., Detroit, Mich., is erecting a four-story addition to its

rear axles. Plans for another shop building are being prepared.

The Cleveland Tool Co., Cleveland, O., intends to expand and has let contracts for a large addition to its plant on Central avenue. The new structure will be two stories in height and will cost approximately \$100,000.

The United States Rubber Co., New York, N. Y., reports net earnings for the six months ending June 30 of \$10,242,365, after allowing for interest charges, depreciation and reserve for Federal taxes. The total earnings for the same period last year were \$7,239,966.

The Warner Gear Co., Muncie, Ind., will erect a new plant to cost about \$250,000.

The Traction Engine Co., Boyne City, Mich., is building a factory, and the first unit is under construction and will be completed within 30 days. The building is 65 by 130 feet and contains approximately 8500 square feet. The com-



The New Auditorium for the Employees of the Clark Equipment Co., Buchanan, Mich.; Above, the Front Entrance; at Left, Looking Toward the Stage from the Entrance; at Right, an Evening's Audience, Looking from the Stage.

and shrubs, with walks and drives so that the lawn would be protected. The purpose was to have the plant quite as attractive without as it was within. While the works have been expanded to meet the requirements of increased business, the environments of the buildings have been preserved.

But the welfare of the employees was still further considered, with the result that the company erected an auditorium at the plant that is in effect a part of the structures. Externally it is two stories high, and there are three wide entrances at the front which lead into an auditorium that is 86 feet deep and 56 feet wide, having a complete stage, amply lighted and provided with scenery to meet practically any requirement. Half of the floor is level, so that it may be used for athletic purposes. There are seats for 625 persons. Besides, there are retiring rooms for the

plant. Three stories will be used for factory purposes and the fourth for offices. The new structure will cover an area of 134,000 square feet, which, added to the present plant, will give a total floor area of 319,000 square feet.

The Olds Motor Works, Lansing, Mich., has received a government contract for 2100 portable kitchen trailers for aviation service. New equipment is being installed for manufacturing the trailers and the turning out of the trailers will be started by Sept. 1.

The Reliance Motor Truck Co., Appleton, Wis., has received a large government contract for machine work on large calibre shells. Additional tools and other machinery is being installed. The company has just completed and equipped a new manufacturing plant at a cost of \$75,000. It will still continue to prepare for a large production of commercial cars and internal spur-gear drive

pany manufactures kerosene-gasoline engines for tractors and trucks.

The Republic Rubber Co., Youngstown, O., has declared its regular quarterly dividend of 1½ per cent. on first preferred stock, payable Sept. 1 to stockholders of record Aug. 25.

The Steel Products Co., Cleveland, O., will erect a one-story power house at 2196 Clarkwood road, southeast. The structure will be 45 by 70 feet and will cost \$17,000.

The Oakland Motor Car Co., Pontiac, Mich., is planning to build motor trucks until the end of the war. The truck will be a one-ton model and production will begin immediately.

The Triangle Motor Truck Co., St. Johns, Mich., has appointed the following new dealers as distributors of their trucks: C. C. Wright, Owosso, Mich.; Motor Car Service Co., 424 Michigan Ave., Lansing, Mich.; Triangle Motor

and Developments Among Parts Manufacturers

Truck Sales Co., 381 Fourth Ave., New York city.

The Dual Truck and Tractor Co., Decatur, Ill., is considering a location for a manufacturing plant and has opened offices. The company will manufacture a machine to be known as the Dual. The vice president is John K. Gumper. The machine has disk wheels mounted upon solid rubber tires, with arrangements for attaching by bolts tractor wheels, which fit over the rubber tires on the two rear wheels. It has a 38-horsepower engine and four speeds forward, and will plow in any kind of soil. The wheel base is 80 inches. With tractor wheels removed the machine resembles a roadster. The machine weighs 3500 pounds.

The Liberty Motor Car Co., Detroit, Mich., has received an order from the government for 2500 two-wheel trailers. The production of passenger cars for last month was 250 and is now averaging 10 a day at present.

The Pennsylvania Rubber Co., Jeanette, Pa., has declared the regular quarterly dividend of 1½ per cent. on pre-



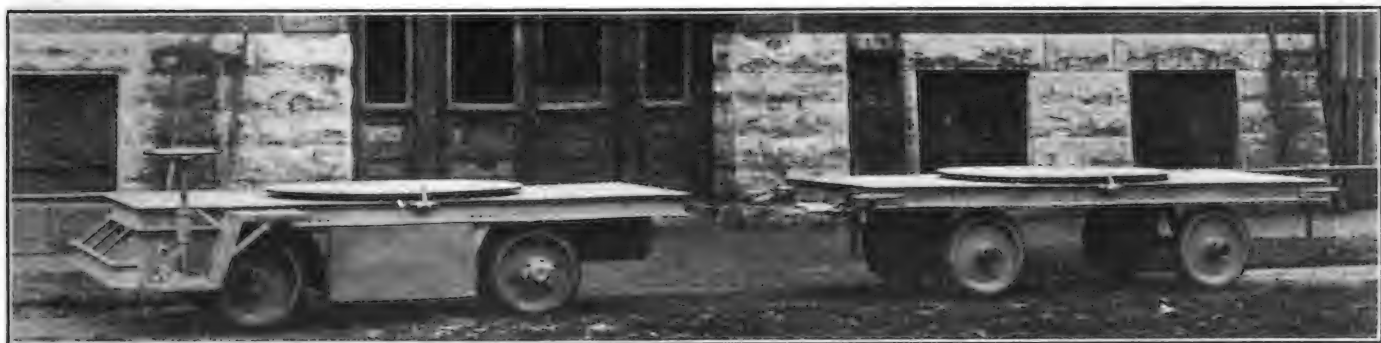
F-W-D Truck Used to Haul Trains of Side-Dumping Cars on Industrial Railroad.

is making extensive additions to its plant, installing additional machinery and equipment to take care of its government contracts. The company manufactures a line of shop and factory equipment and it has been necessary to greatly increase production on the Con-

United States government.

The Dort Motor Co. of Flint, Mich., has increased its capital stock to \$2,000,000. This represents an increase of over \$500,000. The company had been capitalized at \$1,500,000.

The Commercial Finance Corp. of Bos-



Electric Tractor and Trailer with Platform Turntables, Designed for the Use of a Long Structural Steel of Heavy Weight.

ferred stock and 1½ per cent. on common stock, payable Sept. 30 to stockholders of record Sept. 15.

The Continental Auto Parts Co., of Knightstown, Ind., has increased its capital stock from \$10,000 to \$50,000, and

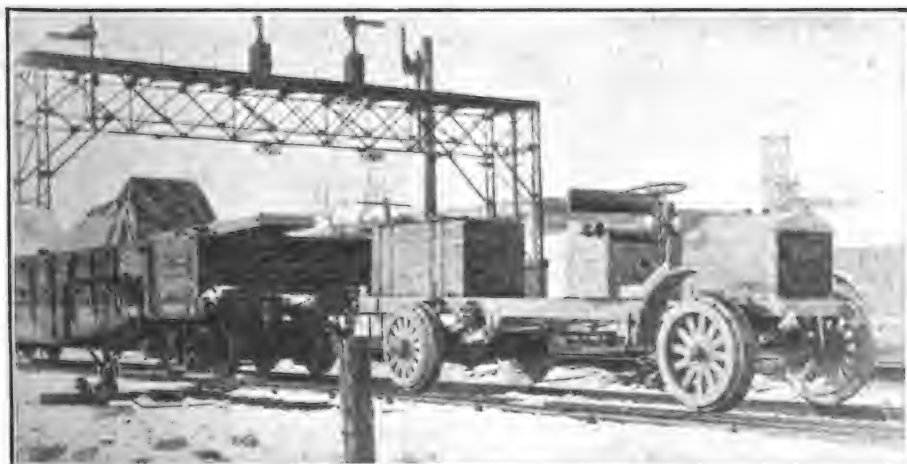
tinental Motor Stand, which is being used by the Department of Military Aeronautics, the Navy, Quartermaster's and Ordnance departments and the various manufacturers now making aeroplanes, trucks and tractors for the

ton, Mass., has formed with a capitalization of \$1,000,000 to finance the sale of motor trucks and tractors throughout New England and later on in other parts of the country. The board of directors comprises F. A. Hinchcliffe, Edward C. Becker and John L. Judd.

The Briscoe Motor Corp., Jackson, Mich., is enlarging plant No. 4 with a substantial addition. The large government contracts for munitions which the company received has made it necessary to expand the manufacturing facilities.

The Motor Mercantile Co., Salt Lake City, Utah, has organized and will manufacture tractors, trucks, motor car and shop equipment and parts. A. D. McMullen is president and general sales manager and V. A. Culver sales manager.

The Cell-Beam Manufacturing Co., 1101 Bedford avenue, New York City, is marketing the Cell-Beam searchlight direct from the factory through the jobbing trade. This will permit closer co-operation between the jobber and the manufacturer.



Selden Truck Equipped with Flanged Wheels, Used for Switching Railroad Cars.

Sunday Gasoline Conservation In Effect

Motoring Public Saves Over 7,500,000 Gallons The First Sunday

The Fuel Administration called upon motorists, owners of motor boats and truck operators to cease using gasoline for pleasure purposes on Sundays commencing with the first Sabbath in September and to continue this conservation until further notice. No mandatory order was issued, but the public arose to the occasion and demonstrated its patriotism on the first Sunday by conserving approximately 7,500,000 gallons. At this rate of reduction in consumption it is believed that it will only be necessary to restrict the use of gasoline on five or six more Sundays in order to replenish the reserves to a point where conservation on this scale will not be required.

A Necessary and Practical Act of Patriotism.

There were a number of exceptions to which the restriction does not apply, as shown in the centre column on this page.

The Fuel Administration's statement, which was issued jointly by Administrator Garfield and Mark S. Requa, Director of the Oil Division of the Fuel Administration, was as follows:

"The United States Fuel Administration considers it necessary that a limited conservation of gasoline be undertaken in the States east of the Mississippi River in view of the increasing demand for gasoline for war purposes and the paramount obligation of meeting promptly and fully all overseas requirements. An appeal is made, therefore, to the people of the United States east of the Mississippi River to exercise rigid economy in the consumption of gasoline during the next few weeks as a necessary and practical act of patriotism.

Consumption of Gasoline Now at Its Highest Point.

"War necessities are being and will continue to be promptly and fully met, but this is the period of the year when consumption of gasoline is at its highest, and the increased domestic demands, together with the extensive military operations in France, have rendered necessary for a limited period the adoption of safeguards against possible shortage.

"In view of the difficulty, if not the impossibility, of differentiating between the various uses to which automobiles are applied, the United States Fuel Administration believes that the greatest measure of economy can be effected with the least interference with the business of the country through the discontinuance of all classes of motor vehicles, motorboats and motorcycles on Sundays.

"The United States Fuel Administration therefore requests that in the section of the United States east of the Mississippi River there shall be a discontinuance of use of the vehicles above specified, including all such as are operated for hire, on each Sunday hereafter until notification that the need for such discontinuance has ceased."

A subsequent statement issued by the Fuel Administration gave in brief the objects that were to be attained by the conservation and a suggestion as to how the order should be interpreted. This statement read as follows:

"The request made by the Fuel Administration that pleasure riding be discontinued on Sundays for the present in order to conserve our supply of gasoline for war needs, was not intended

"The United States Fuel Administration will not attempt to tabulate automobile traffic on Sundays."

The National Automobile Chamber of Commerce viewed the order with favor, feeling that it would give a further opportunity for motorists to prove their loyalty to the war programme, and expressed these sentiments in a statement issued, which in part was as follows:

"In connection with the request of the Fuel Administration for the discontinuance of Sunday automobiling, motorboating and motorcycling for mere pleasure, we are told by an official of the Fuel Administration that the restriction is expected to be necessary only a short time, probably four to six Sundays, which would provide ample increased stocks of gasoline.

Production Increased 27 Per Cent. During July.

"The production of gasoline increased 27 per cent. in July over the same period last year, but consumption increased 29 per cent.

"It was felt that, with the increasing demands from overseas, and some difficulties in transportation, a conservation plan such as outlined is necessary.

"Mr. C. C. Wittingham, chief of the Gasoline Conservation Division of the Oil Division of the Fuel Administration, said it was deemed best to make this first appeal one to the patriotism of the owners, and the feeling is general that the request will be complied with by all car owners.

Automobile Officials View Order With Favor.

"After the conference between Dr. Garfield and Mark L. Requa, chief of the Oil Division, statement was made that the action was deemed necessary as a safeguard against any possible shortage of gasoline for our war needs. Because of the difficulty of differentiating between the various uses to which automobiles are applied, it is believed the greatest measure of economy could be effected with the least interference with the business of the country through the discontinuance of the use of motor vehicles, motorboats and motorcycles on Sunday.

"Automobile officials view the new order with favor because it will give a further opportunity for motorists to prove their loyalty to the war programme."

In connection with the request of the Fuel Administration that taxicabs and pleasure cars be not run on Sunday, A. C. Bedford, chairman of the National Petroleum War Service Committee, made the following statement:

"As a result of the concerted effort of

Exemptions From Order for Sunday Gasoline Conservation

Tractors and motor trucks employed in actual transportation of freight.

Vehicles of physicians, used in performance of professional duties.

Ambulances, fire apparatus, police patrol wagons, undertakers' wagons, and conveyances used for funerals.

Railway equipment using gasoline.

Repair outfits employed by telephone and public service companies.

Motor vehicles on errands of necessity in rural communities where transportation by steam or electricity is not available.

to prohibit reasonable use of gasoline driven vehicles as the means of necessary transportation, where other means are not available.

"Mr. Garfield believes that the public will construe the request wisely and intelligently and will not use their automobiles for other than the most necessary purposes.

"The intention of the request is that all mere pleasure riding be eliminated, but that necessary use of the automobiles be not interfered with.

"Just what is pleasure riding and what is necessary use must be determined by the individual; keeping in mind always that we must have additional reserves of gasoline so that there may be no possibility of delays in overseas shipments.

every factor in the petroleum industry, there has been a substantial increase in the production of gasoline during the past year. Appeals for the conservation of gasoline have also been heeded. It had, therefore, been hoped that no unusual methods of conservation would be necessary. But war necessities are paramount and must be met.

"It has so happened, however, that a tremendously increased demand for gasoline incident to the increased and enlarged war activities on the part of our own army and our Allies in Europe has come at the height of the season of greatest demand for gasoline for consumption in motor vehicles in this country. The situation has been intensified by the unusually favorable weather conditions recently prevailing.

"This season is to the gasoline industry what the middle of winter is to the coal trade—it represents the peak-load of consumption. This period of peak-load, however, is not an extended one, and the precautionary measures now taken as a safeguard against any possible shortage of gasoline for our war programme need not necessarily be of long duration.

Not Enough Gasoline at Present for All War Needs.

"The specific scheme of conservation for the moment applies only east of the Mississippi River. Producers and refiners in the territory west of the Mississippi are now making a careful survey of the whole situation, and unless it is possible to obtain from them a sufficient supply of gasoline otherwise, it may be necessary that within the next week or more the scheme of conservation shall be applied throughout the country.

"The public should understand that the sole purpose of this conservation programme is to supply all war needs and all essentials of domestic consumption. There is not at present enough gasoline for all war needs and all domestic purposes; therefore, the less essential domestic requirements must for the moment stand aside. Under ordinary circumstances the present output of gasoline would represent more than enough to take care of the normal requirements of this country and those countries which depend upon us for their usual supplies.

"The situation is similar to that now prevailing with reference to sugar and wheat; we have enough for our own uses, but not for ourselves and our Allies, too. It is the part, therefore, of every citizen to get behind this programme as a very definite step in winning the war."

Following the first Sunday on which the conservation movement became effective, A. C. Bedford issued a statement summarizing the results that had been obtained, the figures for which were compiled at the request of the Fuel Administration and were obtained by employees of the oil companies. His statement was as follows:

Will Discontinue The National Motor Car Shows During Period of the War

The National Automobile Chamber of Commerce has taken action which will undoubtedly result in the discontinuance of the national automobile shows that have been held under the auspices of that organization in New York and Chicago for the past eighteen years. The directors have voted to recommend to the members that this action be taken and there is no doubt but that the recommendation will meet with unanimous approval.

The action of the directors and the reasons therefor were made known through the following statement sent out by the N. A. C. C.:

"With a view to further co-operating with the governmental authorities in

conserving labor, fuel and transportation, the Directors of the National Automobile Chamber of Commerce unanimously voted voluntarily to recommend to the members the abandonment during the period of the war of the automobile shows held annually for eighteen years in New York and Chicago.

"The makers present felt that the holding of automobile shows would be inconsistent with the patriotic obligations of the industry.

"At its previous meeting, the N.A.C.C., working with the War Industries Board, voluntarily agreed to curtail production of passenger cars to 50 per cent. of the production of 1917, and recommended that all automobile companies take on war work as rapidly as it is obtainable."

"Patriotism cannot be reduced to terms of accounting, but statistics gathered from the territory to which the Fuel Administration addressed its plea for the suspension of pleasure riding in motor vehicles last Sunday in order to save gasoline, furnish striking evidence of the unswerving and unfailing popular support to any war measure.

"Generally speaking, the returns from the States east of the Mississippi, which were those affected by the request, show that the mere intimation of the Fuel Administration that pleasure riding should cease on Sunday was unhesitatingly obeyed by an overwhelming percentage of automobile owners and users.

"It is true that there was a good deal of variation in the extent of the response. In some sections patriotism, as evidenced by the almost total non-use of pleasure vehicles, swept the State; in others, the observance of the request was not so emphatic. In the latter instance the incomplete compliance with the Fuel Administration's request was perhaps due to the fact that the scope of the request was not comprehended or that the situation which prompted the administration's appeal was insufficiently appreciated. Then general result, however, must be intensely gratifying to the department which initiated this policy of voluntary effort.

"To employees of the various oil companies supplying the gasoline requirements of the territory concerned was delegated the task of determining the decrease in the volume of automobile traffic as a result of the Fuel Administrator's request. For the purposes of this test men conversant with such work were placed at key points on automobile routes of all descriptions, both in urban and rural communities in 25 States.

"A careful census was taken of all cars passing these points between the

hours of 2 and 4 P. M. on Saturday, Aug. 31. A similar count was made at the same points and between the same hours on Sunday, and the difference was regarded as representing the number of cars which would ordinarily have been used on Sunday, but which were idle in respect to the Fuel Administrator's request.

"The investigation proved that the more westerly States led in percentage of reduction, Illinois being first with 95, Ohio second with 93, and Wisconsin third with 91. It is estimated that the observance of the request over the Eastern section of the country resulted in the saving of from 100,000 to 150,000 barrels of gasoline.

"The result of the test is presented below by States, the automobile traffic between the hours mentioned on both days being given in the first two columns, the columns following showing the percentage of reduction in the use of cars on Sunday and the automobile registration in each State:"

State.	2-4 p.m. Aug. 31.	2-4 p.m. Sept. 1.	P.C. Reduc.	Cars Reg'd.
Illinois	19,997	1,006	95	362,742
Ohio	28,774	1,952	93	415,962
Wisconsin	2,181	183	90	182,700
Dist. Col.	7,939	774	90	36,968
Kentucky	3,596	891	90	57,542
West Va.	826	107	87	34,371
Louisiana	3,269	429	87	37,600
Tennessee	10,115	1,265	87	51,900
Indiana	2,165	334	85	207,381
Maryland	6,400	989	84	61,102
Florida	2,282	361	84	42,846
Maine	906	149	83	38,439
Mass.	1,947	354	81	156,798
Alabama	3,589	668	81	44,869
Penn.	46,923	8,765	81	324,184
Conn.	8,592	1,721	80	75,900
Rhode Island	3,396	625	80	26,399
New Jersey	14,663	2,805	80	124,519
Georgia	4,750	906	80	89,481
New York	17,627	4,617	74	422,853
Mississippi	2,016	583	71	37,500
No. Carolina	906	282	68	61,946
So. Carolina	680	230	66	47,950
Michigan	6,378	2,245	65	236,981
Virginia	1,499	549	63	65,000



We have been constantly told that the horse was passing, but shrugged our shoulders in doubt as government statistics indicated that old Dobbin was still holding his own and eating up hay so fast that each wisp would soon have the value of an asparagus tip. All doubt about the matter has now been cleared up, as we have undisputable evidence to offer that the horse is even losing out where he made his last stand—among the country folk.

Those who in their boyhood have attended the local country fair learned of the supremacy of the horse as a feature, a fact which was also impressed upon the mind by the flaring posters showing a field of trotters coming down the stretch, that were blazoned broadcast through the countryside for weeks prior to this crowning event of the harvest season each year. Those who have these cherished memories of their youth uppermost in mind could not imagine, even with a vivid flight of fancy, that the flivver could oust the horse from this place in the limelight, yet such is the case, and the evidence is found in a publicity bill sent out by the management of a country fair in the Bay State, and from which we must infer that the officials have discerned that the horse no longer occupies the same place in the heart of the farmer as formerly, but takes second place to the admiration for the automobile.

This advertisement, which reads much the same as the old announcements, except that the word "cars" is used in place of "horse," reads in part as follows:

"On each day of the fair a Ford Nov-



elty race will be run, governed by the following conditions:

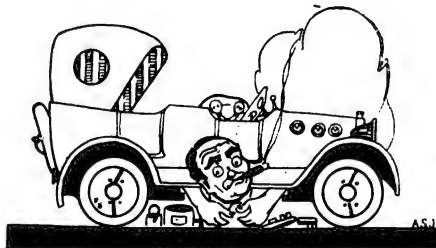
"Entries will be limited strictly to Ford Touring Cars without self-starters.

"Each car is to be driven by its owner or a member of his or her immediate family or a bona fide employee who has been in the employ of the owner for at least 30 days preceeding date of race.

"Cars to carry drivers only; cars to stand in line at wire, driver at wheel, engine killed, and at a signal driver to dismount from right side of car, crank engine, pass around back of car and mount, run around track to fourth-mile line, stop on same or back up, kill engine, dismount as before, crank engine and continue to next fourth-mile line and to the next fourth-mile line in same manner until one mile has been run.

"In addition to the above, there will be a grand parade of Ford cars around the track at 3 p. m. Thursday, Aug. 22, 1918. No entry fee will be charged and undecorated cars can participate, but it is urged that every car at least be provided with small American flags."

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Al Schwartz of Newport, Ky., is the only catch-as-catch-can automobile repairing champion of the world, and his laurels rest easily upon his brow, for he fears no contenders, having certain physical qualifications to which he owes his unquestioned supremacy and which make it unnecessary for him to suffer handicaps in doing work that the ordinary mechanic must experience. The secret of his prowess lies in the fact that he was a contortionist by profession before taking up the work of repairing automobiles, and his ability to twist himself into almost any shape to gain access to nuts, bolts and other parts beneath the car or in difficult positions enables him to do work minus creepers, pits, multi-shaped wrenches and other accessories without which the best of normal mechanics are balked and which require extra time in handling.

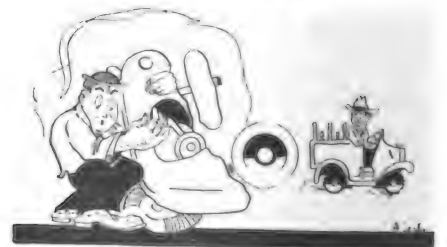


Women are doing their bit at home in a way to elicit the warmest praise, particularly those who have automobiles or who are capable of driving cars. They have not only formed reserve corps for operating ambulances or driving cars in emergency work, but many have turned to the practical work of helping in the distribution of foods to stabilize values and relieve the congested freight situation.

Mrs. Andrew W. Crawford, Bryn Mawr, Pa., has organized and is head of an organization composed largely of women who drive automobiles for gathering fruit and transporting it to canneries. The women volunteers are assigned to pick up fruit in baskets at certain farms and take it direct to canneries, which are notified that it is coming. Fruit is also taken direct from the farms to market or to consumers. This organization is doing a most valuable work and its operations could be extended greatly if the needed volunteer drivers were obtainable.

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The flivver is a muchly maligned and abused car, although it apparently has manifested no qualities to merit this vituperation, and at times, especially in emergencies, owners find it worthy of their highest praises. All its various virtues have been sung, from those pertaining to its economy to those having to do with its reliability, but now we have occasion to call attention to an additional point of superiority which, while always latent in its makeup, has never been called to the attention of the public. This point is its structural flexibility, a quality which was ably demon-



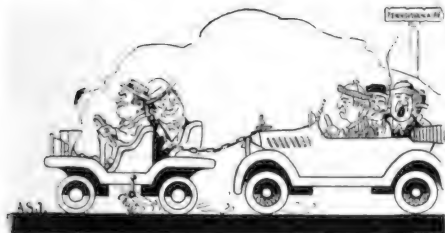
strated by a jitney operator recently. This driver piloted his car with a load of passengers into a passing trolley car with such force that it took on the form of the well-known, but not melodious, musical instrument called the accordion, after same had sounded its final note. Under such circumstances the owner of the average motor car would have immediately placed a call for a wrecking machine and looked up the nearest junkman, but this driver, unperturbed over his seeming predicament, blandly asked his passengers to alight and then set to bending the divers portions of said car back into line and form again.

As he drove off with his fares, leaving the trolley car stranded, he admonished the dazed motorman as follows:

"That's the best thing about these flivvers, you can easily bend them into shape again."

Although the Cadillac Motor Car Company has not built one-cylinder automobiles since the early days—1903 and 1904—it is not at all unusual for it to hear from owners who are still running these old cars.

One of the most interesting of such letters lately received comes from a



man in Washington, D. C., who says he uses his single cylinder Cadillac in his sales work among the grocery jobbers in Washington and Alexandria, Va. The car is a 1903 Model A—one of the first Cadillacs built. The owner writes:

"I am not a mechanic, but I am a 'Jack-of-all-trades,' and I keep the old 'box so it will run up hill and down hill and drag anybody out of a rut that I meet in one, and there have been some of them.

"Some time ago I met a party on Capitol Hill with an automobile carrying four men, and they had broken their crankshaft. I weigh 220 pounds, and I had my brother with me, who weighs 265 pounds. I pulled this automobile with four men in it, while my brother and I were in my old single-cylinder machine, and I pulled the whole business over to Anacostia with no trouble whatever.

"I took these people out over Pennsylvania Avenue, and while people cheered the old Cadillac, they joshed the fellows sitting in the big machine.

"I make it a point to help any fellow who may be broken down on the road."

Every time you see a picture of a Japanese thoroughfare you wonder how automobiles have any room to maneuver at all, let alone how they can observe traffic laws as stringent as those in force on Fifth Avenue. But according to a well-known motor car importer who has just returned from Nippon, the Japs have their own ideas of how a car and



driver should behave, and what is more, take pains to see that all foreigners understand them.

The Japanese traffic rules as translated into English and posted in Pyang Yang, Chosen Province, read as follows:

"You must drive your automobile at the speed of eight knots per hour on the city road and at twelve knots per hour on the country roads.

"In narrow place of road corner and bridge, speed slowly.

"When you see policeman throwing up his hand you must not drive in front of him.

"When you pass the corner and the bridge, ring the horn.

"When you get ahead of the passenger on foot or the cow or the horse you must ring the horn.

"When you meet the horse or the cow speed slowly and take care to ring the horn and not be afraid of them. Drive slowly when you meet the horse and the cattle; do not make them afraid and carefully make the sound. If they afraid the sound you must escape a little while at the side of the road till they pass.

"When you drive the motor car do not leave the driver seat and take care lest unexpected trouble happen.

"Do not drive the motor car when you get drunk and do not smoke on driver's seat.

"When two cars are driving in the same road, if there is another car in front of yours, you must keep 60 yards away from him, if you go ahead of him ring horn and pass him.

"When you cross the railway, wait until the other train and other cars pass through.

"When anything the matter with your car you go police station and tell him.

"When you want to have a driver or exchange another, you must enclose driver's address, career and age."

"SPECIAL NOTICE—You must never put overload on your automobile. The licensed capacity of your Ford car is five passengers, two in front house and three in back house."

At the present time when the automobile industry is threatened with its first period of retrenchment after some 20 years of expansion and development, the



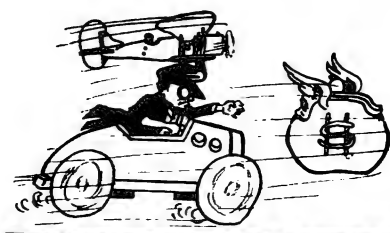
story of the first practical gasoline car manufactured takes on added interest. This story, which is told briefly by Elwood Haynes, the inventor of the car, is as follows:

"During the delay in the work of constructing the pipe line for the Indiana Gas and Oil Company at Greentown, Ind., it occurred to me that some better means of locomotion over the highways than the horse and buggy might be procured, so I accordingly laid plans for a mechanically constructed vehicle.

"In the fall of 1892 I moved to Kokomo and the following summer (1893) had my plans sufficiently matured to begin the actual construction of a machine. I ordered a one-horsepower marine upright, two-cycle, gasoline engine which weighed 180 pounds.

"When the gasoline and battery connections were installed, the motor, after considerable cranking was started and ran with such speed and vibration that it pulled itself from its attachments. Luckily, however, one of the battery wires was wound about the motor shaft and thus disconnected the current.

"In order to provide against vibration, I was obliged to make the frame of the machine much heavier than I first in-



tended. The 'horseless carriage' was built up in the form of a small truck. The framework in which the motor was placed consisted of a double hollow square of steel tubing, joined at the rear corners by steel castings and by malleable castings in front.

"At that time no figures were accessible for determining the tractive resistance to rubber tires on ordinary roads. In order to determine this as nearly as possible in advance, a bicycle, bearing a rider, was hitched to the rear of a light buckboard by means of a cord and spring scale. An observer seated on the buckboard recorded as rapidly as possible 'draw-bar' pull registered by the scale.

"With this data at hand it was an easy matter to arrange the gearing of the automobile so that it would be drawn by the motor. Crude though this method may appear, it shows a striking agreement with the results obtained to-day by much more accurate and refined apparatus.

"July 4, 1894, when ready for the test, it was hauled into the country about three miles behind a horse carriage and started on a nearly level turnpike. It moved off at once at a speed of about seven miles per hour and was driven about 1½ miles into the country. It was then turned about and ran all the way into the city without making a single stop."

War Industries Board and Representatives of Automobile Manufacturers Make Agreement For Curtailment

Through an agreement between the National Automobile Chamber of Commerce and the War Industries Board, the production of passenger automobiles for the current six months ending Dec. 31, 1918, will be cut immediately, with a maximum output limited to 25 per cent. of the total number of cars produced in 1917.

No announcement was made as to the basis on which manufacturers would operate after that date, but the letter which set forth the plans for the current curtailment repeated the request made some time ago by the War Industries Board that all car manufacturers should get on a war work basis before the end of the year.

Stocks of Materials Unbalanced and Will Be "Matched Up."

The letter was signed by Alexander Legge, vice chairman of the War Industries Board; J. L. Replogle, director of steel supply, and George N. Peek, commissioner of finished products of the board. It declared that, on the basis of reports furnished by automobile manufacturers, the stocks of raw and of semi-finished materials aggregated in value approximately \$150,000,000, and were greatly unbalanced and cannot be liquidated until "matched up" with other materials in the manufacture of cars. In part the letter was as follows:

"Supplementing our letter of the 9th instant, we beg to advise that we have now received most of the reports embodying the data and information which we requested you to furnish us and have given those reports careful study and consideration. From them it appears that the stocks of raw materials and of semi-finished materials in the hands of manufacturers of passenger automobiles, while large, are greatly unbalanced, with the result that these large stocks, aggregating approximately \$150,000,000, cannot be liquidated until they have been "matched up" with other materials necessary to manufacture the completed cars.

Makers Asked to Limit Purchases of Equipment and Supplies.

"The conclusion has been reached that it is in the public interest, as well as of your industry, that it be assisted as far as practicable, without interfering with the war programme, in the liquidation of its stocks now on hand; and to that end the priorities division of the War Industries board will accord a degree of preference designed to accomplish this result, to all manufacturers of passenger automobiles who will subscribe to a pledge to be prescribed by

the priorities commissioner embodying, in substance, the following:

"That the manufactory will limit its purchase of materials, equipment and supplies to such as are absolutely necessary to match up its stocks now on hand.

Production Not to Exceed 25 Per Cent. of Total Output in 1917.

"That its production of passenger automobiles and all repair parts therefor shall not for the six months ending with Dec. 31, 1918, exceed 25 per cent. of its production for the calendar year 1917.

"That it will conserve and economize in every possible way its stocks of iron and steel, and their products now in its hands, or that may come into its possession, and will release on request of the War Industries Board to such other manufacturer of passenger automobiles as may be designated by the said board such of its stocks as can be utilized by such other manufacturer and which are not required by it for either the limited production above specified or for war work.

"That it will from time to time render such reports of its activities, under oath or otherwise, as may be called for by the War Industries Board.

Again Urge Manufacturers to Get On War Work Basis.

"The War Industries Board will, in carrying into effect the terms of the pledge herein provided for, use as a basis, as far as applicable, the sworn reports recently rendered it in pursuance of its request.

"In justice to the passenger automobile industry we feel again impelled, as the situation appears to us now, to frankly repeat our statement to you of Aug. 9, that the urgent war requirements for iron and steel are so great that the probability of your industry procuring iron and steel after Jan. 1, 1919, for the manufacture of passenger automobiles is so uncertain that we again urge the members of your industry to as rapidly as possible utilize your facilities for the production of direct and indirect war requirements, not only in the interest of the nation, but in the interest of your industry itself. In such effort the members of your industry will have the active and whole-hearted co-operation of this board."

The National Automobile Chamber of Commerce sent out a circular to the passenger car manufacturers explaining the curtailment program and enclosing a pledge. The situation as it affects the industry is summed up by the N. A. C. C. as follows:

To passenger automobile manufacturers:

Your attention is called to the enclosed form of pledge headed

"Passenger Automobile Manufacturers' Pledge,"

which has been prepared by the War Industries Board in pursuance of its letter to the National Automobile Chamber of Commerce dated Aug. 24, 1918.

"For convenience two copies of the pledge are sent herewith, one for your files and the other to be promptly dated, signed and forwarded to C. C. Hanch, Chief, Automotive Products Section, War Industries Board, Washington, D. C.

"Owing to the continued increasing demands of the government for steel, it was decided by the War Industries Board to administer the arrangement made with passenger automobile manufacturers largely from the standpoint of steel.

"No special priority class rating has been assigned to the passenger automobile industry. It is possible that the degree of preference which may be accorded the automobile industry will vary with reference to different classes of steel required. After the pledges have been signed and sent in each manufacturer will make application to the director of steel supply for a permit to purchase steel or steel products. It is our understanding that this applies principally to the items covered by the inventory reports recently furnished to the War Industries Board.

Procedure to Be Followed by Makers Who Assemble Their Product.

"In the case of concerns which are strictly manufacturers, application should be made for steel sheets, carbon forging steel, alloy steel, strip steel, pig iron, bars and cold rolled steel.

"In the case of concerns which are primarily assemblers, application should be made for the principal units, such as motors, transmissions, front axles, rear axles, frames, bodies, steering gears, self-starters and springs.

"In cases where a concern manufactures some of its units and purchases others, application should be made for the classes of steel required for the units manufactured by the applicant and also application should be made for the completed units which are purchased by the applicant.

Regular forms of application will be printed as soon as possible and in the meanwhile the steel section has prepared temporary multigraphed forms, which will be furnished manufacturers upon application to the Directors of Steel Supply, War Industries Board, Washington, D. C.

The application forms are self-explanatory, but they should be filled out in duplicate and both copies sent to the Director of Steel Supply, War Industries Board, Washington, D. C. The applications will be approved promptly or will be disapproved if the war requirements for any particular class of steel make such action necessary. One copy of the approved application will be returned to the manufacturer, which is to be attached to the manufacturer's purchase order for steel or products made of steel and iron.

Will Furnish Estimates of Each Makers Requirements.

The Automotive Products Section of the War Industries Board will furnish the steel section an estimate of each manufacturer's steel requirements under the program covered by the letter from the War Industries Board to the National Automobile Chamber of Commerce of Aug. 24. These estimates will be based upon the sworn inventory statements filed with the Automotive Products Section by the manufacturers. National Automobile Chamber of Commerce.

Alfred Reeves general manager.

Passenger Automobile Manufacturers' Pledge.

Following is the form of pledge to be filed by passenger car manufacturers with the War Industries Board, Automotive Products Section:

War Industries Board,
Washington, D. C.

Gentlemen:—

Attention: Automotive Products Section.

The undersigned hereby pledges itself
(1) Not to purchase iron or steel or iron or steel parts or equipment except under permit from the Director of Steel Supply.

(2) To limit its purchase of materials, parts, equipment and supplies to an amount which does not exceed either.

(a) The amount absolutely necessary to match up its stocks now on hand, or

(b) The amount necessary to permit a production of passenger automobiles and all repair parts therefor for the six months ending Dec. 31, 1918, not in excess of 25 per cent. of its production for the calendar year 1917.

(3) That it will conserve and economize in every possible way its stocks of iron and steel and their products now in its hands, or that may come into its possession, and will release on request of the War Industries Board to such other manufacturer of passenger automobiles as may be designated by the said board such of its stocks as can be utilized by such other manufacturer and which are not required by it for either the limited production above specified or for war work.

(4) That it will from time to time render such reports of its activities under oath or otherwise as may be called for by the War Industries Board.

Name of manufacturer—

Official title—

Address—

New Revenue Bill Increases Tax On Owners, Passenger Cars and Taxes Gasoline and Tires

THE manufacturers' tax on passenger cars is more than trebled and the tax on motor trucks nearly doubled in the draft of the new war revenue bill which has been presented to the House of Representatives by Chairman Claude Kitchen of the Ways and Means Committee. In addition there is a provision to tax owners of passenger cars on a horsepower basis and a tax of two cents a gallon is placed on gasoline.

Under the terms of the new measure passenger cars are placed in a so-called luxury list, and are to be taxed 10 per cent. on the selling price instead of the three per cent., which at present is assessed. Motor trucks are to be taxed five per cent. A tax has also been placed on automobile accessories, including tires and tubes, the amount being 10 per cent.

These taxes will produce about \$123,750,000, and that the horsepower tax to be paid by passenger car owners will produce an additional \$72,920,000. The horsepower tax will be based on the standard method of calculating horsepower by the S. A. E. formula.

Tax on Cars in Owners Hands Will Be Based on Horsepower.

Following are the provisions of the measure which apply to the automobile industry:

"Section 900. That there shall be levied, assessed, collected and paid in lieu of the taxes imposed by section 600 of the revenue act of 1917, upon the following articles sold or leased by the manufacturer, or importer, a tax equivalent to the following percentages of the prices for which so sold or leased:

"(1) Automobile trucks, automobile wagons, automobile trailers or tractors (including tires, inner tubes, parts and accessories therefore sold on or in connection therewith or with the sale thereof), five per centum.

"(2) Other automobiles or motorcycles (including tires, inner tubes, parts and accessories therefore sold or in connection therewith or with the sale thereof), 10 per centum.

"(3) Tires, inner tubes, parts or accessories for any of the articles enumerated in subdivision (1) or (2), sold to any person other than a manufacturer or producer of any of the articles enumerated in subdivision (1) or (2), 10 per centum.

"Section 902. That there shall be levied, assessed, collected and paid upon all gasoline, naphtha and other similar petroleum products having a flash point below 100 degrees Fahrenheit, as tested by the Taglibue open cup tester, and suitable for motor power, sold by the manufacturer, refiner or importer, a tax of two cents a wine gallon.

"Section 1006. That 60 days after the passage of this act and thereafter on July 1 in each year and also at the time

of the purchase of a new or used automobile or motorcycles by a user, if any date than July 1, there shall be levied, assessed, collected and paid upon the use of automobiles and motorcycles, a special excise tax at the rates as follows: Motorcycles, \$5; automobiles (other than electric) of 23 horsepower or less, \$10; more than 23 horsepower and not more than 30 horsepower, \$20; more than 30 horsepower and not more than 40 horsepower, \$30; and more than 40 horsepower, \$50; electric automobiles, \$5 per horsepower and 50 cents for each 100 pounds of weight.

"In case of a tax imposed at the time of the purchase of an automobile or motorcycle or any other date than July 1, and the case of the tax taking effect 60 days after the passage of this act the amount to be paid shall be the same number of 12ths of the amount of the tax as the number of calendar months (including the month of sale or the month in which is included the 61st day after the passage of this act as the case may be) remaining prior to the following July 1).

"For the purpose of the section the horsepower of all automobiles other than steam or electric shall be computed as follows: Square the diameter of the cylinder in inches, multiply by the number of cylinders and divide by two and one-half. In the case of steam or electric automobiles the horsepower for the purpose of this section shall be the horsepower rating fixed and advertised by the manufacturer or importer thereof at the time when sold by him."

PURITAN TO HANDLE ALCO PARTS.

The American Locomotive Co., which formerly manufactured the Alco passenger cars and trucks, has sent out a circular stating that the entire spare parts business and stock of parts for these models have been sold to the Puritan Machine Co. of Detroit. The circular letter, which was signed by President Andrew Fletcher, reads as follows:

"When this company discontinued the manufacture and sale of automobiles and trucks an announcement was made that the company would arrange to furnish owners of "Alco" vehicles with spare parts for a period of five years. This period elapsed on Aug. 13, 1918.

"The Puritan Machine Co. has entered into an agreement with this company to supply "Alco" vehicle owners with spare parts for a further five years period ending Aug. 13, 1923.

"We are informed by them that orders for spare parts may be sent for the present to the following: Puritan Machine Co., at Providence, R. I.; International Motor Company, New York City, and Ralph J. Chandler, Los Angeles, Cal."

PLATE XXVI.

ORNAMENTAL CONCRETE GARAGE FOR ONE CAR

Simple In Construction and Free From Repair
Maintenance and Insurance Charges

(Designed by the Architectural Department of the Automobile Journal Publishing Co.)

THERE is no material used in the construction of buildings possessing as many points of superiority as concrete, which is a mixture of cement, sand and broken stone or coarse aggregate, according to the quality of finish desired. It is adapted readily to most any form or type of structure, can be readily handled by the average mason or plasterer, and the ingredients are accessible most everywhere.

A garage built of concrete has the primary feature of permanence, both as to appearance as well as structural stability; is fireproof, and requires no outlay for repairs or maintenance, if properly built.

With these points in mind, the accompanying design for an ideal garage is submitted. It incorporates all the essentials for a building to house one car and is suitable for any estate, at a cost which represents the minimum outlay when the fact is taken into consideration that it is cheaper than a wooden or other type of building, as in the long run maintenance charges are negligible. Its dimensions, 20x12 feet, afford accommodations for the largest car, with ample room to walk about the car and with sufficient room also for a workbench at the rear end.

A foundation wall extending 3 feet, 6 inches below grade, 10 inches thick, will afford ample support for a structure of this size. In erecting the walls, forms should be built on the foundation and the work carried up to the desired height without too long intervals between successive pourings, as there is a tendency to be a marked line between batches of concrete cast at different periods of time. The wall need not be over six inches thick, but unless the very best of materials are at hand and a liberal mixture is to be used, it is better to make the walls nine inches thick.

The walls should be cast of a mixture of one part cement, two parts sand and four parts stone, and should be reinforced with $\frac{3}{8}$ -inch round steel rods placed 14 inches apart, running both horizontally and vertically. The forms for casting the wall should be made of one-inch matched lumber, supported by 2x4-inch studs to prevent

bulging, and they should be built the full height or movable forms of half the height of the walls can be used.

There are a number of ways of treating the surface of the concrete to obtain different effects. By rubbing the concrete with a carborundum brick and applying cement grout immediately after the forms are removed, a smooth finish is obtained. If a rough, pitted finish is desired to match the adjoining buildings, this effect can be secured by use of a sharp pointed tool, and if a pebble effect is preferred, the forms may be removed early and the outer cement film brushed away with a wire brush or washed away with a weak solution of muriatic acid.

With an ornamental type of garage of this character a neat approach adds greatly to the appearance and should have a gentle slope if the ground conditions permit. This can be constructed of a coarse mixture of concrete similar to that used in the foundation walls or floor, and finished off with a layer of fine mixture about an inch thick, scored off to give a paving effect.

The roof is built up on 4x6-inch plates which are bolted to the concrete walls. Rafters, 2x6 inches, are laid 24 inches on centres and boarded over with hemlock roof boards, $\frac{7}{8}$ -inch thick, laid three inches apart and covered with extra grade shingles laid four inches to the weather. The cornice is made of white pine stock and painted with two coats of paint. A saddle board of galvanized iron, well painted, is better than wood and gives better service.

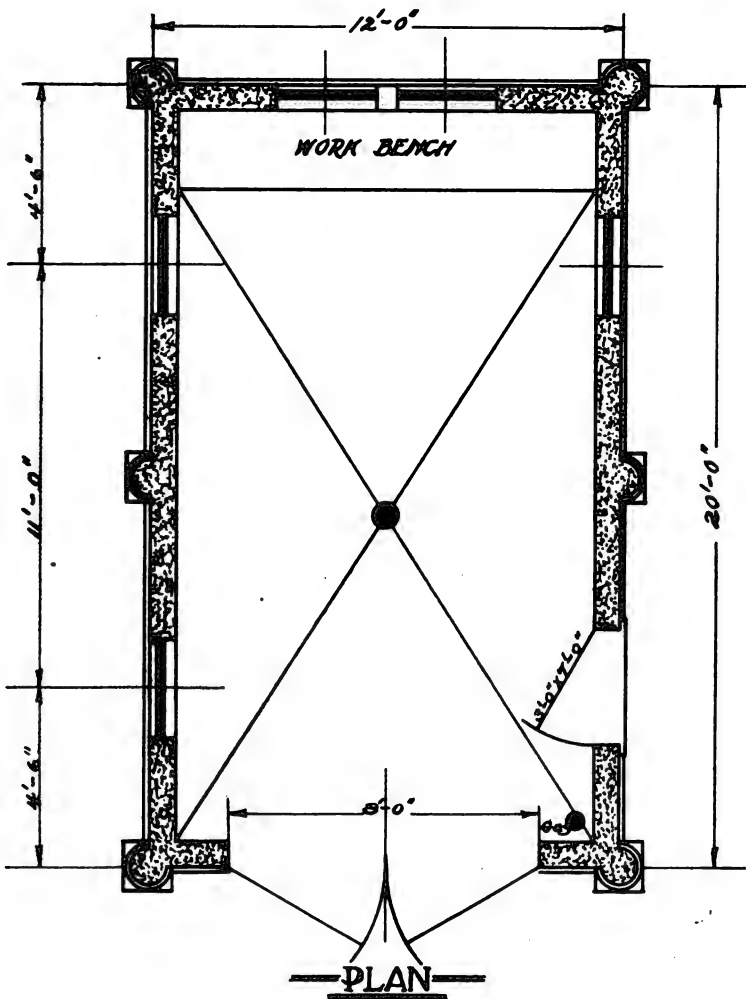
The doors are 4x9 feet x $2\frac{3}{4}$, made of white pine stock and hinged with Stanleys' garage door set No. 1776, which consists of the necessary hinges, catches and fittings. This set, which can be purchased at most any hardware store, includes three pair of 10-inch recessed pad extra heavy T hinges, one 6-inch chain bolt with staples and 6-inch foot bolt with floor plate and a thumb latch with door handle.

The cost of a building of this type, including the best of materials and fittings, should not exceed \$800 under average conditions.

PLATE XXVI



ELEVATION
SCALE



Specializing In Transmission Gears

Covert Gear Company Has Unexcelled Facilities For Production of Gearsets For Trucks and Tractors

By F. E. Mosher, Secretary and General Manager the Covert Gear Co.



Section of the Gear Blanking Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

THE motor truck is just being discovered. That is, its stupendous commercial possibilities are just being comprehended, even by the automotive industry. And it is safe to say that the general public has as yet no idea of what the truck will mean to it in the future, nor the magnitude to which the truck business will be developed within a few years.

It has always been thus. Either the coming invention is underestimated, or it is overestimated. The railroad, whose necessarily restricted field should have been at once apparent to every man, was spoken of in glowing terms not long after the first tracks were laid. Each farmer was promised a railroad running

through his farm and into his barn yard. The automobile was less fortunate. When it arrived the pendulum of popular opinion had ceased its swing toward the side of credulity, and was well on its journey toward the opposite extreme of doubt. The motor car was the victim and so was the motor truck.

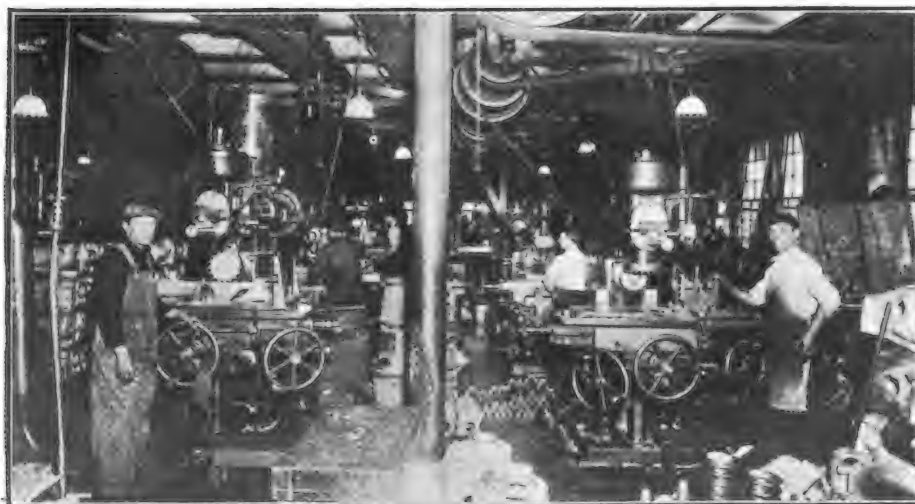
In fact the majority of persons today have absolutely no proper estimation of the possibilities of the motor truck—they don't realize that the truck, not the railroad, will constitute the line which will bring every isolated farm and village into close touch with the world, increase the radius of any one merchant's customer field two, three or four times, and enable the manufacturer to carry on his industrial activities with far greater facility.

Realized Truck Possibilities.

A few firms in close touch with the motor truck field realized the truck's possibilities some years ago. Among these few I believe that the Covert Gear Co. was one of the first. Because our company did realize the possibilities of the truck the Covert company today dominates in the truck transmission field.



Section of the Drill Press Department of the Covert Gear Co.'s Lockport, N. Y., Plant.



Section of the Milling Machine Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

For years the engineering department of the Covert company has made a thorough and first hand study of the requirements of truck transmissions. It has been in intimate touch with the leading truck companies ever since the truck was a commercial possibility. And we must admit that the devotion of the Covert company to heavy vehicle power transmission was because that company foresaw the splendid future of the motor truck when even some motor truck manufacturers did not see it, and through its service in this direction won a prestige among motor car manufacturers that has made the name Covert on a transmission sufficient proof of its worth.

This branch of the industry will at least equal, if it does not outstrip, the

passenger car, is the faith of Covert officials. That faith was confirmed when in 1916 a number of prominent makers of pleasure cars went into the manufacture of trucks and in 1917 many others joined them. The demand for motor trucks up to the present has largely manifested itself from the cities; today it is beginning to come from the farms and the country—a demand that virtually will never reach a point of saturation.

Can Meet Any Demand.

The Covert company has placed itself in a position where it can handle any amount of business, no matter how great and rapid increase. Its transmission facilities today are absolutely unexcelled. This, of course, is to be expected from almost any firm that has spent years specializing on one part of the motor truck and passenger car. Its engineering department, through long study of truck transmission requirements, is in a position to advise truck manufacturers on this important unit, and if found desirable to design a transmission to meet just this special problem.

The Covert plants in Lockport, N. Y.,

ert transmissions. In April, 1916, the name of the company was changed to its present title—Covert Gear Co., Inc.

When Philip A. Clum became connected with the company in 1909 the Covert company had reached a turning point in its history. The sales of Covert trans-

Grand street. At the same time additional property was acquired to provide for future expansion of the business, the company realizing that, at its rate of growth it would double and redouble its output capacity again and again. The vision of the Covert officials proved true.



Section of the Gear Cutting Department of the Covert Gear Co.'s Lockport, N. Y., Plant.



Section of the Gear Inspection Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

are splendidly equipped to handle such business. The company has been thoroughly alive to the necessity of a highly efficient organization in every department, but especially in the important engineering and production departments. Men have been carefully selected for all positions of importance and the personnel of the organization ranks with that of any of the foremost organizations in the automotive field. In the automotive industry the names of P. A. Clum, president and treasurer; B. V. Covert, vice president, and A. A. Gloetzer, manager of engineering and sales, are factors to conjure with.

Company Founded in 1903.

The Covert Gear Co. was until 1909 the Covert Motor Vehicle Co. It was founded Oct. 27, 1903, to manufacture a small car. Early in 1907 the first transmissions were produced. They proved so successful that within a brief period the company was forced to discontinue motor car manufacture entirely in order to keep pace with the demand for Cov-

In 1910 the company was growing with such rapidity that it was compelled to double its capacity. A further addition was made to the plant in 1913-1916 by the construction of a three-story modern plant to be used for the manufacture of gears, one of the most important items of the product which had hitherto been provided for from outside sources.

The Covert plants in Lockport are in the very center of distribution and the shipping facilities are unexcelled. The proximity of several large manufacturing centers render the raw material supply obtainable without shipping delay.

The plant buildings are thoroughly modern in design and construction, equipped with the latest labor saving



Section of the Assembling Department of the Covert Gear Co.'s Lockport, N. Y., Plant.

missions in that year were so large that the plant on Richmond avenue, in Lockport, was found entirely inadequate for the increase in production necessary, and a new two-story factory was built on

machinery, insuring efficient and economical production. The buildings are of brick, steel and concrete construction, thoroughly fireproof and sprinkled throughout.



THE UPKEEP OF THE SPARKPLUG.

Car operators who make it a practice to disassemble the sparkplugs whenever they require cleaning should use the greatest care when putting them together, especially when adjusting the hexagon nut that compresses the washer sealing the space between the porcelain and the shell. If the nut is screwed up too tightly the porcelain will crack as the temperature of the engine rises.

After replacing the plug in the cylinder it is a good plan to test it for leakage. When the engine is running, kerosene may be squirted between the hexagon nut and the porcelain. Leaks will then appear in the form of bubbles.

When testing for leaks, the kerosene can also be applied to the threads of the shell to ascertain that the plug is screwed into the cylinder tightly. A leak around the threads can be stopped by smearing with a mixture of lubricating oil and flake graphite. This method will greatly facilitate future removal.

STOPPING OIL LEAKAGE IN A FORD ENGINE.

(Figure 517.)

Very often the gasket between the crankcase and the oil pan will omit or "split" oil, and frequent tightening of the nuts will have no effect. This oil pan is made of flexible metal, and a few blows from a hammer where the leakage occurs will so bend the pan as to prevent further leakage.

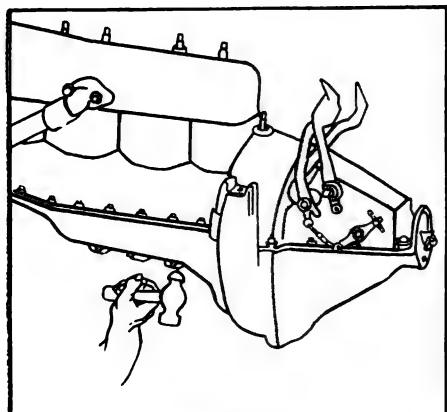


Figure 517.

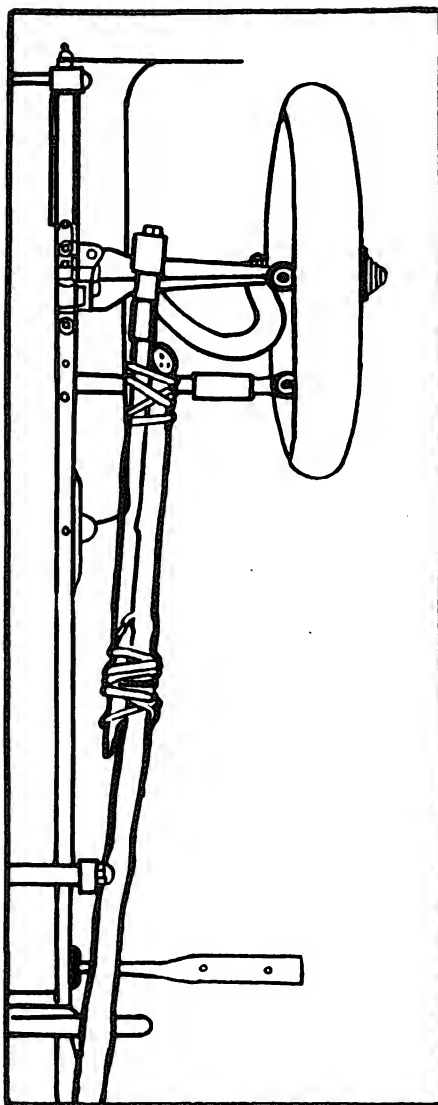


Figure 518.

DRIVING HOME WITH A BROKEN STEERING GEAR.

(Figure 518.)

It is seldom that the steering gear breaks, but when it does happen it is usually in a place where it is almost impossible to make a repair, and it is best to know what to do should this accident occur. First remove the mud guard and then secure a long, slim,

round limb from a tree. This is lashed to the steering knuckle as shown in the illustration to form a steering bar, and after this operation is accomplished the car may be driven slowly home in safety.

BRAKE FOR COUNTERSHAFT.

(Figure 519.)

The countershaft clutch keeps up an annoying spinning after the clutch has been disengaged, and some mechanics still use the dangerous method of setting up a braking action with the palm of the hand. A better and safer method is to take a piece of brake lining long enough to reach from the countershaft guide rod over around the clutch pulley and swing a little below. Two copper rivets will hold the end about the guide rod while the other end is fastened in like manner to a piece of wire to which a handle has been attached. When the clutch is disengaged, a pull on this brake will effectively stop the shaft from spinning, the time required to do this depending upon the amount of pressure that is placed upon the brake.

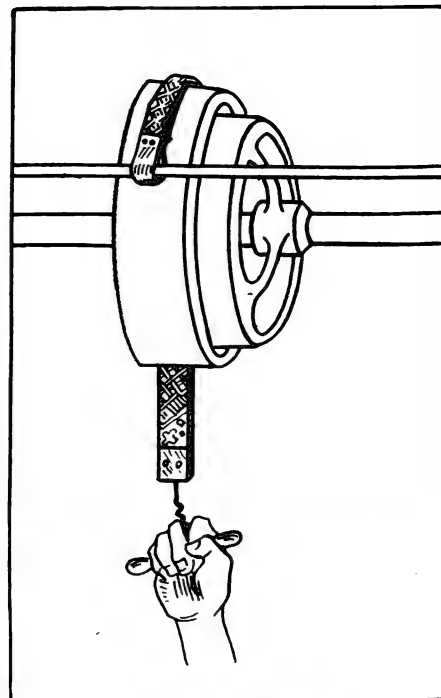


Figure 519.

TESTING CIRCUIT WITH AWLS AND LIGHT.

(Figure 520.)

Two awls connected on a wire loop to a lamp in the manner shown in the sketch is very useful in detecting a broken wire about an automobile. The idea is to bridge over the defect, or broken wire, and thus locate it. Each of the awls is connected to one end of a wire with a lamp that will indicate whether the circuit is open or broken. The points of the awl can be inserted through the insulation and any part of the wiring or insulation tested in this manner. In testing wires or instruments where there is no current it, of course, is necessary to have some means of producing current, and batteries connected with this device will have the desired effect.

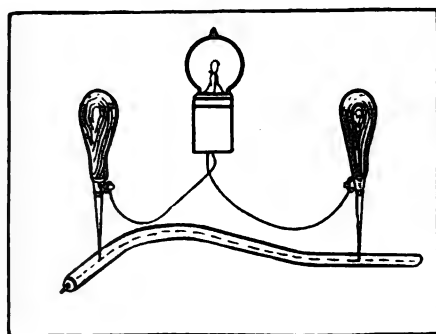


Figure 520.

USE OF MIRROR IN REAR AXLE ADJUSTMENT.

(Figure 521.)

It is of great importance that the drive gears in the rear axle are properly meshed, and if they are not, both trouble and damage are certain to result. In many axles it is very difficult to see the gears after they are assembled in the housing, and in some cases they cannot be seen at all. The gears should so mesh that the teeth come to one-sixteenth of an inch to bottoming.

A small mirror about the size of a silver dollar fastened to a handle something like a dentist's mirror will enable the repairman to see that the teeth of the gears are meshed properly. By inserting this instrument into the axle housing the gears may be plainly seen and adjusted until they are in proper alignment.

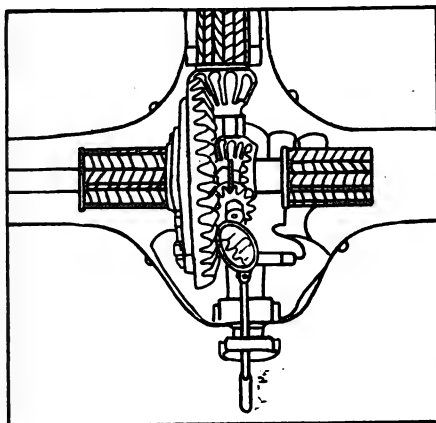


Figure 521.

TAKING OUT PLAY IN SPRING BRACKETS.

(Figure 522.)

When a car has been in service for a long time there generally develops considerable wear in the spring brackets which is responsible for some play. This can easily be fixed by the insertion of suitable sized washers or "shims." If the spring bolts be loose they should be replaced by new ones. Looseness of parts always produces rattles and squeaks that are annoying, as well as hard to find. When "pulling down" the used car, brackets and spring bolts should always be gone over carefully and a careful inspection at this time will eliminate future noise from this source.

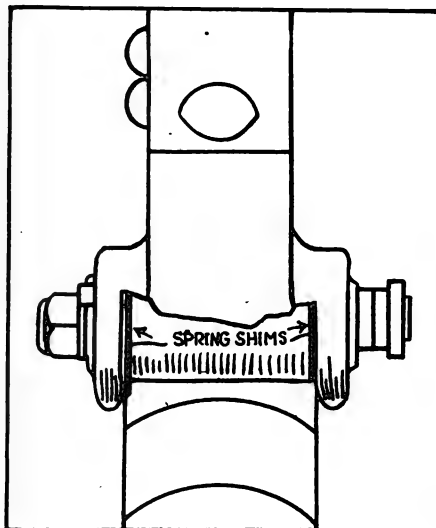


Figure 522.

TESTING FOR WEAK VALVE SPRINGS.

(Figure 523.)

It is frequently difficult to locate the cause of misfiring at low engine speeds. There are several probable causes, but if after making a series of tests for air leakage, weak ignition, poor mixture, etc., the trouble cannot be located, it is advisable to try the exhaust valve springs to determine if they have lost

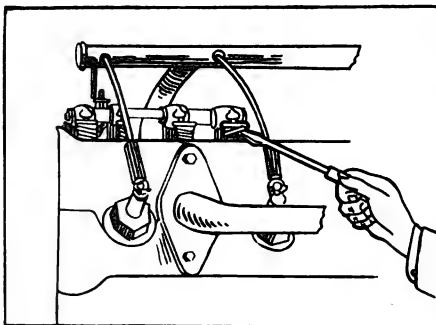


Figure 523.

their tension. Should an exhaust valve spring be too weak it will not seat the valve at low engine speeds, which will, of course, result in irregular engine action. A screwdriver blade inserted between the coils of the springs will at once ascertain this defect if such is the case. This operation should be done while the engine is firing slowly. If the missing stops when the blade is inserted between the coils of the spring it will indicate that the spring has lost its tension and that either a new one should be installed or the old one stretched, if possible. The missing results from the tendency of the piston to raise the valve from its seat, thus drawing in some of the exhaust gas.

SOFT WATER FOR RADIATOR.

Radiator manufacturers advise that hard water in the cooling system of the automobile is detrimental because when it is heated the fluid produces a scale which deposits in the form of fine brick colored powder. This substance clogs the fine passages and greatly impairs the radiator's efficiency. A simple test to determine the nature of the water being used is to make a soap solution and fill a glass vial about half full. Then add a few drops of the water that is to be examined. If the fluid is hard, the solution will turn a milky color.

REPAIRING CRACKED WATER JACKET.

While the best possible repair for a cracked water jacket is to have it welded, the following usually meets with success: With a three-cornered file open the crack in the jacket to a V shape without increasing the opening on the inner side. Smooth down the edges and deposit upon them any of the preparations which are sold for silver plating. The material will readily adhere to the smooth surface, and if the pressure is not too great the repair will last indefinitely.

CARE OF THE TOP.

If a top is folded when it is wet it will sooner or later be ruined. Grease or dirt should not be removed with gasoline. This method tends to dissolve the rubber composition in the fabric and will make it blister. The leather top should be washed with soap and water, the water preferably warm. A top dressing should then be applied. The top will hold its shape better if continually left up. When it is lowered care should be taken to push the folds of the fabric well in from the bows, as this will prevent creasing. A brushing inside will do much to lengthen its life. The top curtains and celluloid windows that have been scratched or blurred can be renewed by an application of acetone varnish.

The result of the directions above being carried out will enable the owner to take pride in the appearance of his car and also add an appreciable amount upon the car should he wish to sell.



Accessories Department



The Carborundum Co., Niagara Falls, N. Y., is marketing their Carbo valve grinding compound in a new combination, flat, oblong can, four inches long, two inches wide and one inch high, as shown in the illustration. This can is arranged to contain fine and coarse compound, two ounces of each, and the tin partition in the centre keeps the two grades separate. It is a very convenient package, both from the shipping and stocking standpoint, as well as for the user, who will always find it right side up.

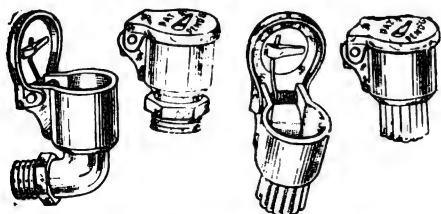
Manufactured and distributed by the Carborundum Co., Niagara Falls, N. Y. Write for prices and literature.

The Puritan Oxgin-Iza is one of the simplest devices on the market for securing the advantages of mixing moisture with the combustion charge in the engine of an automobile. It is a well known fact that the introduction of a proper amount of water to the cylinders while the engine is running results in the generation of greater power, saves gasoline and eliminates carbon. This device draws the steam from the internal space of the radiator through the radiator hose to the control valve and from there to the Puritan inlet gasket, which fits between the carburetor and manifold, eliminating the need of drilling and tapping to install. The control valve is operated by the driver from the seat and is used for closing the feed when starting a cold motor and when the engine is going to be stopped so that all the moisture will be dried out before the engine cools off and thus eliminate danger of rust. As the steam is taken out of the radiator cap by this device, its operation is not interfered with by rusty water, anti-freeze mixtures, anti-leak compound or anything that would mix with the cooling system.

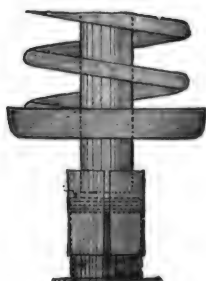
Manufactured by the Puritan Machine Works, Stoneham, Mass. Write for prices and literature.

Rex All Enclosed Oil Cups have many special features and are designed to meet all needs and incidentally overcome the many objections to the old style cups. They are made with a one-piece shell and easily opened and self-closing cap or lid, which is actuated by a spring, which is enclosed without obstructing the bore. This spring being constantly lubricated it will not rust or stick. The cups are dust as well as rain proof and may be painted without affecting the mechanism or action. They are made in all sizes and are guaranteed as to construction and action.

Manufactured by Frank X. Devlin, 108 St. Claire Ave., Detroit, Mich. Write for literature and prices.



Rex All Enclosed Oil Cups.



The Townsman Valve Adjuster and Silencer.



Jefferson Replacement Coil.

The Jefferson Electric Manufacturing Co., Chicago, Ill., recently placed on the market a line of battery replacement coils and fittings which are sufficiently flexible to displace any type of coil on battery equipped cars. The extreme flexibility of Jefferson coils is obtained from several features, which include the fittings, adjustable caps, terminals and mounting arrangements.



With a small stock of Jefferson coils any service station, garage or repair shop will be prepared for any emergency. Heretofore it has been necessary to lay up a car for several days while a new coil was being obtained. Now, however, any car can be placed in service within a few minutes. It is only necessary to remove the old coil and connect a Jefferson coil. Starting conditions require a coil that will produce a hot spark when the battery is at the lowest ebb. Jefferson coils are guaranteed to take care of this extreme condition.

To aid jobbers, dealers, service stations and garage men the Jefferson Electric Manufacturing Co. have compiled a folder containing complete and authentic data covering all standard battery ignition systems. This folder lists all makes of cars from 1912 to the present date, and gives the year, model, type of ignition and style of Jefferson coils to be used for replacement. This folder will be sent free of charge to any dealer, garage, service station or jobber. Requests for the folder should be addressed to

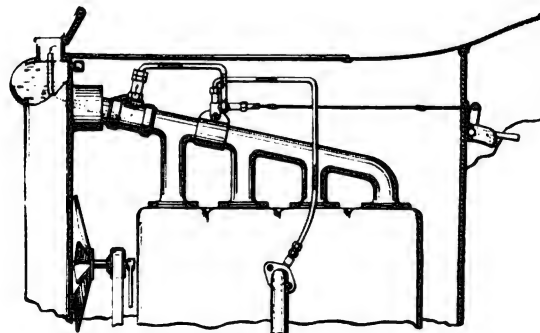
The Jefferson Electric Manufacturing Co., Congress and Green Sts., Chicago, Ill.

Common Sense Auto Polish is a non-greasy liquid that is strong enough to remove all foreign matter, even cup grease, but is so mild that many of the large piano dealers in the country use it to keep their stock in good condition. It cleans and polishes in one operation, removes all road oil and grime down to the original factory finish and leaves a highly polished dry surface that will not collect dust.

Manufactured by the Common-Sense Manufacturing Co., St. Louis, Mo. 35c size, 75c size and quart, \$1.50.

The Townsman Valve Adjuster and Silencer for Fords eliminates the click of the valves and takes up the wear. It is adjustable from time to time and can be placed on every valve, regardless of play, for it takes up play from the thickness of one disc, .006 inch and upward, to the amount necessary to quiet the valve.

Manufactured by the Midway Mechanical Co., St. Paul, Minn. Long sleeve of all models previous to 1912, and short sleeve for 1912 model and later. Write for prices and literature.



The Puritan Oxgin-Iza.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



The Advance Automobile Accessories Corporation is introducing a transmission lining for Ford cars that can instantly be identified by a white stripe running along the center. In a folder headed "Another Triumph of America's Genius," this lining is described as setting a new standard in transmission fabric quality. A treatment has been worked out by the chemists of the Advance Institution which resists and neutralizes the action of hot oil on cotton fabric. Moreover, a mechanical method of applying the treatment to the woven fabric also has been successfully developed, with the result that White Stripe solution thoroughly saturates every fiber of the lining, making it retain its heat and oil resisting qualities longer than any lining now on the market.

White Stripe Lining is to be marketed both in rolls and strips of three to the box. The retail price per box of three, east of the Rockies is \$2, and from the roll the retail price is 32 cents per foot.

Manufactured by the Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago. Write for prices and literature.

The Guide Motor Lamp is a special new type heavy duty electric truck head lamp. This lamp is of the same size as has been used on class "B" U. S. trucks, but of much simpler construction, much cheaper and is equipped with a special front lens. The most important features about the lens is that it is designed to project a clear, wide ray of light directly on the ground, eliminating the glare above the three foot limit, and with the 180 degrees spread to the sides it gives the desired light on the sides for turning, getting into difficult dark alleys and driveways, etc. It is absolutely dust, water and rattle proof. While the brackets are of the standard fork type of six-inch centers, it is subject to a small range of latitude. If necessary it can also be provided with the class "B" type of brackets. The compliments the Guide company have received from the few truck engineers who have had a chance to see it would indicate that this type will meet with great success.

Manufactured by the Guide Motor Lamp Manufacturing Co., Cleveland, O. Write for prices and literature.

The Niswander Rim Remover is a practical and handy tool for removing and replacing the demountable rim in automobile tires. The contracting and expanding is done by right and left hand threaded rods operated by a hand wheel, which gives an even and steady pull, contracting the rim anywhere from one to four inches, and the rim hooks, together with the rim braces, are so constructed that the harder the pull the tighter they grip the rim in either operation. The rim hooks are made of a good grade of spring steel and will, therefore, adjust themselves to any width rim. The tool weighs two and a half pounds and folds to a length of nine inches, making it possible to store it in the tool box.

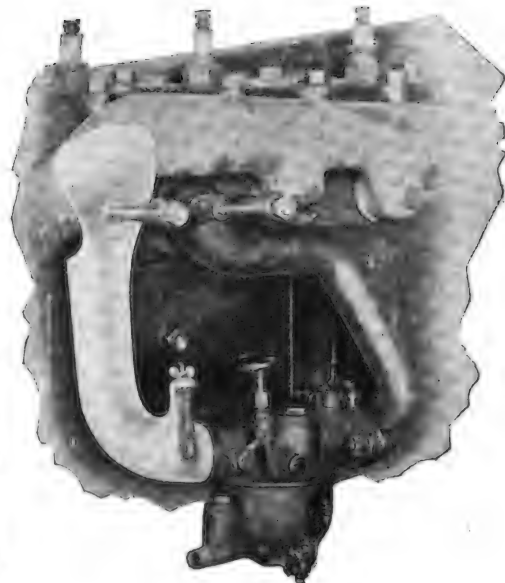
Manufactured by the Niswander Manufacturing Co., Quincy, Ill. Price, \$3.50.



The Guide Motor Lamp.



Motor Driven Visible Measure Gasoline Dispenser.



The "Ritemix" Gasoline Economizer and Compensator is a carburetor air heater and regulator for the Ford engine, consisting of a scientifically constructed air valve fitted into the opening of a specially designed pipe which replaces the regular hot air pipe leading to the Ford carburetor. This device has an exceptionally large flange, which fits over the top of the exhaust manifold, preheating the air about 200 per cent. in excess of the amount heated in the original hot air pipe. The valve moves with each pulsation of the engine and supplies a uniform amount of air at all engine speeds, thus insuring a proper mixture of gasoline and air at all times. It can be installed in two minutes time by anyone without boring or fitting and requires no attention when once installed.

Manufactured by the Perfection Auto Parts Co., 2130 Superior Ave., N. E., Cleveland, O. Price, \$3.50.

The Motor Driven Visible Measure Gasoline Dispenser is designed to eliminate the incidental losses in the vending of gasoline. The accompanying illustration shows the general appearance of the apparatus opened up to show the mechanism. The pump is driven by a Westinghouse one-quarter horsepower motor, entirely enclosed in the base in accordance with the rules of the National Board of Underwriters. The Brady dispenser visibly delivers a full gallon for every gallon ordered. When the wagon delivers gasoline to the garage the tank gauge shows accurately the full quantity obtained. Every gallon drawn from the tank into the dispenser is shown on the tank register, which can be checked with the tank gauge. Thus both the public and the garage owner are protected from loss. Furthermore, the oil companies are enabled to make more rapid deliveries than by measuring cans from wagons to garage tank where the Brady dispenser is installed.

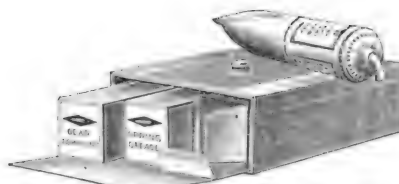
Manufactured by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Write for literature and prices.

Grease-in-Tubes is the clean, handy, ready way to use grease. It is economical, as there is no waste—fresh grease always being ready and usable to the last drop. This grease is put up in three tubes in a carton called "The Lincoln Highway Kit" and consists of one tube of cup grease, one tube of spring grease and one tube of gear compound. This grease is of the best grades obtainable and is always ready for instant use without the usual soiling of hands and clothing in inserting it.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Price, \$1 a kit.



The Niswander Rim Remover.

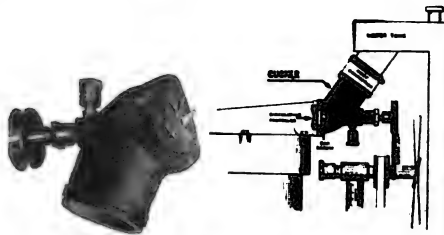


Crew Levick Lincoln Highway Kit.

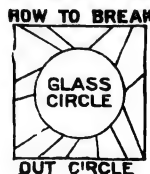
(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Gusher Water Circulation for Fords is the simplest and most efficient water circulating pump. It is made of best materials, is accurately machined and is furnished complete with belt ready to install in the car. This pump keeps the water cool, increases power and saves the engine from overheating. The Gusher will circulate five gallons of water every minute, thereby increasing the present circulation from seven to ten times as rapid as gravity—that being the present circulation of the Ford. The Gusher is sold on a written guarantee of money refunded if not entirely satisfactory.

Manufactured by the Chuley Auto Supplies Co., 471 E. Ohio St., Chicago, Ill. Price, \$5 complete.



Gusher Water Circulator.



The Red Devil Circular Glass Cutter.

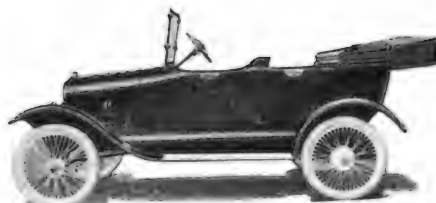
The Red Devil Circular Glass Cutter, No. 033. When in operation, the glass to be cut is placed on a flat surface, the base of the cutter at the centre of the glass to be cut. Careful measurement should be made and the cutter head adjusted to one-half the diameter of the circle to be cut, and fastened in place by the thumb screw. The base to be pressed down and held firmly in place by one hand and the head operated by the other, the point of beginning to be away from the body so as to give the hand of the arm operating the head an opportunity for a wide sweep. Some practice may be necessary, but the cut can be made by a firm pressure, not too heavy, and as nearly as possible by one sweep around the circle without stopping. In cutting, the base must not be allowed to slip or change position, and if necessary, two sweeps or two cuts may be made, as nearly as possible a full one-half circle in each.

The small illustration shows how to break the glass to leave the circular glass for use. Cuts are made from the outer circumference of the circle to the edge of the glass. The pieces can be broken off by gently tapping on the under side of the cuts, but away from the edges of the circle, to prevent breakage of the inner portion.

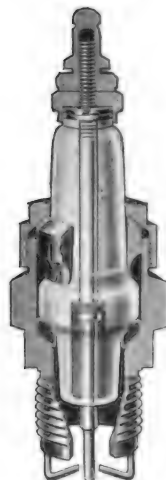
Manufactured by the Red Devil Tool Works, Smith & Hemenway Co., Inc., 120R Colt St., Irvington, N. J. Price, 50 cents.

A New Guide Book Case has been placed upon the market for motorists who have experienced the difficulty of reading a road guide book under adverse wind and weather conditions. This annoyance can be eliminated and the comfort of the trip increased by the use of this attractive and convenient case. The front is made of transparent pyralin sheeting and the back of a pyroxilin coated leather substitute of the Fabrikoid type. The guide book, opened at the desired page, is slipped in under the pyralin sheet and the text is easily read even when the car is travelling at a high rate of speed. The wind cannot rustle the leaves and the Fabrikoid cover protects the binding and leaves from rain and grease, as it is absolutely proof against all three.

Manufactured by the Du Pont Fabrikoid Co., Wilmington, Del. Write for prices and literature.



"Amesbilt" Five-Passenger Ford Body.



Hercules Spark Plug.

"Amesbilt" Five-Passenger Ford Bodies have every detail and quality known to the master builder. The makers claim that the same workmanship, quality and class of material that go into the high-priced motor car built "Amesbilt" bodies are used in these Ford bodies. The seats are tilted to invite relaxation. The cushions are fitted with deep coil springs of the proper resistance to absorb road shocks and the body sets low and has pure stream lines. The inside measurement from dash to back of front seat is 42 inches. Depth of cushions 17 inches. Front seat 36 inches wide. Back of front seat to back of rear seat 39 inches. Depth of rear cushion 20 inches. Overall length 122½ inches. These bodies are made in a variety of styles at attractive prices.

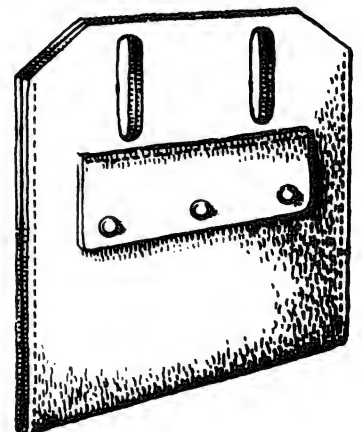
Manufactured by the F. A. Ames Co., Inc., Owensboro, Ky. Write for prices and literature.

Roll-Rite Ball Bearings improve the present Ford bearings, two of which fit perfectly into each front wheel in conjunction with the original bearings, thereby giving four bearings to each wheel, and are in contact with the present bearings (only a little metal retainer and felt washer being removed, the metal hub cap supplied with these bearings fits over the inside of the hub), causing a perfect alignment and true operation of these latter bearings, the race washers of these bearings serving also as race washers for the Ford bearing. The balls are held in place by a rivetless metal retainer, preventing crowding together and allowing each ball to operate independently of the others. This bearing will also fit the Chevrolet 490 car. It is easily installed by removing the wheel and slipping bearing into place.

Manufactured by the Roll-Rite Mfg. Co., Charleston, S. C. Write for prices and literature.

Hercules New Model Spark Plugs have a spring gland that is the result of years of experimental work with a view to eliminating recognized weaknesses of the old style construction. This gland slips over the porcelain beneath an outer lock nut, its lower flange riding top of the tapered shoulder and absorbing contraction and expansion through its sliding spring action. It serves further to prevent loosening through expansion. The copper packing seat is still used, but it is relieved of excessive strain through the spring action of the upper gland. The double packing system serves to hold the plug compression tightly by absorbing the shock or strain and maintains a perfect alignment and stability. Loose assembled centre stem, reinforced electrode and other special features are exclusive with this plug.

Manufactured by the Eclipse Mfg. Co., Indianapolis, Ind. Write for prices and catalogue.



Fabrikoid Guide Book Case.



Roll-Rite Ball Bearings Showing Their Application to the Ford Axle.





Corbin-Brown Speedometers are made for automobiles, motor trucks and motorcycles, and in special models for Ford cars, operate on the centrifugal principle, and thus are not affected by extreme temperatures or by electrical influence. Quick jumps or slumps of the thermometer do not disturb the Corbin-Brown reliability, nor is the instrument affected by the electrical influence exerted through an electric lighting system or an electric self-starter on a car.

The drive gears and shaft are in one piece for greater strength and accuracy. The cable is of the exclusive link type, which gives maximum strength and practically eliminates friction in the casing. It is almost unbreakable, but if a repair should be found necessary a new link can be easily inserted by anyone. While this cable is strongly recommended by the Corbin company, the flexible shaft type can be supplied instead if desired.

One of the most valuable exclusive features of the speedometers is the maximum speed hand. This hand, fitted as an extra, registers the highest speed attained by the car and remains at that point until reset to zero. This can be done in an instant at any time.

The maximum speed hand does away with the annoyance and risk of watching the speedometer to keep track of speed while traveling at a fast pace. The record of highest speed remains as long as wanted.

For use on motor trucks, the maximum speed hand can be supplied with locking arrangement to prevent resetting by the truck operator. It thus acts as a reliable check on overfast driving, as the speed record remains for inspection by the employer. It cuts repair bills, eliminates accidents and adds to the life of the truck.

The special models for Ford cars can be supplied complete with handsome cowl board, or simply with a neat bracket for attaching to the dash.

The Corbin company has an interesting illustrated catalogue, dealing in full with the attractive features of its speedometer line, which will be sent upon request.

Manufactured by the Corbin Screw Corp., New Britain, Conn. Write for prices and literature.

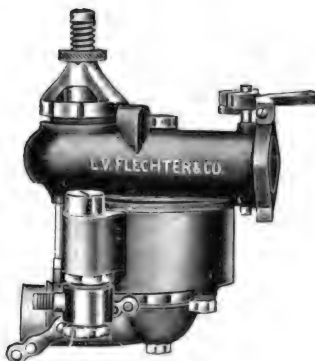
The Warren Vaporizing Device is a mixing or vaporizing gasket. Every automobile or gas engine has, at the point where the carburetor is attached to the manifold intake, a gasket, usually of asbestos, placed there simply for the purpose of making this an air-tight joint where the two metal flanged ends of the carburetor and manifold come together and are attached by bolts. The central orifice of this gasket is open, the same size as the inside of the manifold intake.

At this point, and to be used in place of the ordinary gasket, is where this mixer or vaporizing gasket is used. It requires absolutely no changes at all in the engine, no holes to bore, no special tools, no adjustment, no movable parts, but is simply inserted at this point in place of the open gasket in common use and above referred to. The vaporizer is formed by using two thin gaskets of regulation size

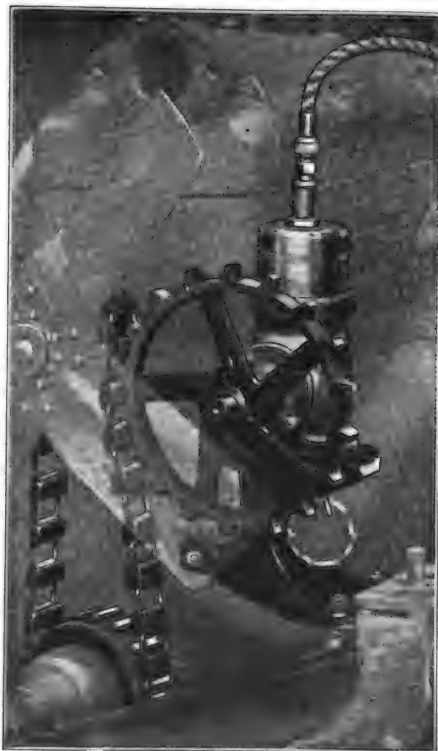
and shape, of asbestos; one especially cut copper gasket of the same size and shape, with extending fingers, and two sets of woven screen wire of the full size and shape of the gasket, and covering the central orifice or opening. This is assembled with an asbestos gasket between each sheet of wire gauze, with the metal plate used for one outside, with extending fingers which go over and engage the other outside gasket, and when cemented and compressed together, make a compact, air-tight gasket exactly the size and shape of the one ordinarily used at this point, with the exception that the central opening is covered with two thicknesses of gauze screen wire of proper mesh.

When inserted, all gas and air passing from the carburetor to the combustion chamber of the engine must pass through this mixing or vaporizing gasket. Small drops or particles of gasoline cannot pass through, but are broken up into the form of gas, making a more uniform mixture, and getting power out of every drop of gasoline that passes through, by transforming it into explosive gas.

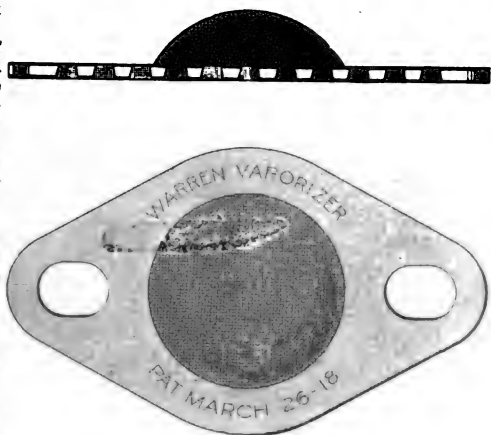
The object of the carburetor and mixing chamber is to vaporize gasoline. Through the needle valve or spray nozzle of the ordinary carburetor a big percentage of gasoline reaches the combustion chamber of the engine still in liquid form—sprays or small particles of drops. The only por-



The Flechter Carburetor.



The Crane Power Tire Pump Operated with the Crowe Mechanical Fan Belt.



tion of it from which the power is obtained for the explosion is that part that is transformed into gas. The portion still held in liquid form merely burns, passes out through the exhaust valve in flame, leaving a deposit of carbon in the cylinders.

Distributed by John W. Warren, San Antonio, Tex. Write for prices and literature.

The Flechter Carburetor's correct principles of vaporization and air mixing have been combined with simplicity of construction to a degree that insures unusual fuel economy with reliability of operation. Complicated adjustments that can only be properly set by experts have been eliminated entirely. In this carburetor a "fixed" nozzle or spray is employed. The orifice of this jet is calculated for the size of the carburetor and the type of engine on which it is employed, and it is unalterable, the only adjustments necessary being those regulating the air supply. The low speed air adjustment acts directly on the amount of air admitted and is of the simplest form. It is placed on top of the carburetor and will lock at any point for which it is set. No tools are necessary to make adjustments, and both the low and high speeds are plainly marked so that they can be turned to the proper direction to give the result desired.

Manufactured by L. V. Fletcher & Co., 192-200 Jackson Ave., Long Island City, N. Y. Write for prices and literature.

The Crane Power Tire Pump and the Crowe Mechanical Fan Belt make a successful application of a power tire pump to the Ford car. The power is taken from the shaft of the engine. The Crowe Fan Belt consists of a steel chain into which blocks of oak tanned sole leather are firmly embedded. When used with the Crane Pump the belt serves a double purpose. In turning the fan it acts as a friction belt, as the fan pulleys come in contact with the leather only. The belt is engaged with the pump sprocket only when the pump is in operation, acting then as a silent chain and insuring a positive drive. Instead of being set into the moving piston, the Crane packing ring is stationary and the piston moves through it. By slightly turning the cylinder, which is threaded into the crankcase, the ring is compressed (being of patented design and special alloy) so that it hugs the piston more closely; thus the adjustment is variable to compensate for any wear and the compression is increased at will. This adjustment can be made while the pump is in operation. The pump, bracket, 13 feet of pressure hose with gauge, bolts, nuts and driving parts, together with the fan belt, are sold complete ready for installation.

Manufactured by the Bay State Pump Co., 100 Purchase St., Boston, Mass. Price, \$12. Write for literature.



Whittmann Motor Camps.

The Hoggson Auto-Time Register is designed to fill the requirements of the small shop employing only a few men. This machine not only records the "In" and "Out" of employees, but also "Sales Made," "Goods Received" or "Delivered;" from the place is recorded and initialed in fact, everything coming to or going by the person in charge. The record is made on a paper strip from the roll attached to the back of the machine and it feeds through a guide. By the aid of suitable slips or cards it will time job work, cost of manufacture, etc., without any interference with the paper roll. It is self-inking and prints clear and distinct the year, month, day, hour, minute.

Manufactured by S. H. Hoggson & Co., 27 Thames St., New York city, N. Y. Price, \$25 complete.



Twin Spring Shock Absorbers.

"Triplexd" Gasoline Hose uses the highest quality hose cord in its fabric cover, which is woven on with a circular loom, laying the fabric on the rubber under a pressure of 330 pounds to the square inch, so that it bites right into the rubber, which is pressed still closer around the metal lining. This metal lining, the makers claim, is the most flexible construction ever devised. The steel strip is made of best quality slow-rolled metal of accurate, uniform thickness and heavily electro galvanized, forming a gasoline hose that is non-leakable and of great durability and strength.

Manufactured by the Metal Hose and Tubing Co., Brooklyn, N. Y. Write for prices and literature.

Whittmann Motor Camps, when packed are only four feet six inches long and six inches in diameter. They strap to the running board of the car and the duffle which incloses it permits room also for the stowing of blankets, etc. It is but the work of a moment to unroll it, fasten one end to the running board, set up its one leg peg down the guy ropes and fasten the peak of the tent over the car. The tent is then ready for the night and the double bed, which is 4½ feet wide by six feet three inches long, is as comfortable as a mattress. The camp walls are joined and overlapping with a screened port on each side, adjustable from within to admit the breeze, but so designed as to exclude rain and insects. These camps are made for two, four, six or eight people with separate rooms for each two. The dimensions of each room are six feet eight inches long by four feet six inches wide. The bed tension is automatically self-adjusting to weight and sags less the more weight is put upon it. The tent is made of waterproof balloon silk and the entire equipment, including tent, bed and carrying case, weighs 15 pounds per person.

Manufactured by J. H. Whittman Manufacturing Co., Kansas City, Mo. Write for prices and literature.



"Triplexd" Gasoline Hose.



Ekern Portable Garage Grease Gun.



Nugent's Shaft Oiler.

The Ekern Portable Garage Grease Gun consists of a heavy seamless steel cylinder mounted on three wheels, having five feet of hose attached to the bottom of the cylinder, with shut off valve and nozzle at the end of hose. It registers and measures accurately the amount of grease put in the gear case or differential, and will work equally well on liquid oil as well as hard grease. It is equipped with two sets of gears. When the crank is pushed in it disengages the low gear and immediately engages the high gear, which operates the piston either up or down at high speed. The cylinder is 20 inches long by six inches in diameter, capacity 20 pounds of grease or 2½ gallons of oil. The piston is covered with best quality cup shaped leather and is provided with an expansion ring in piston, which prevents any grease or oil from leaking by. The piston also has an automatic air vent, which releases the vacuum in the cylinder when cranking the piston up for refilling. The base is provided with a step lock which lifts the castor up off the floor and sets the gun rigidly while cranking.

Manufactured by H. G. Paro, 1410-12-14 S. Michigan Boulevard, Chicago, Ill. Price, \$47.50.

Twin Spring Shock Absorbers for Fords eliminate jolts, jars, strains and vibration. The Twin Spring is a supplementary spring, instantaneous in its action, leaving the leaf spring free to perform the work for which it was designed. Every road shock coming from the wheels passes through the coil springs on its way to the car body, and the shock is transformed and the life taken from it without in any way disturbing the action of the leaf springs. They are easily and quickly applied in 30 minutes to any type or car spring, and, once adjusted, never change their position.

Manufactured by the Twin Spring Co., 1000 Boylston St., Boston, Mass. Price, \$10 per set (rear) for Fords and all cars.



Garco Gasket Roll.

Garco Gasket Roll was devised for the countless small repair jobs where a cut piece of sheet packing is needed. It is made of specially selected long fiber asbestos with a network of strong fine wire interwoven in it, giving it the greatest possible strength and wear resisting ability. It is packed in a durable, dust proof carton cut 10 inches wide by 40 inches long. It is also furnished in full rolls of 250 pounds and half rolls of 125 pounds.

Manufactured by the General Asbestos and Rubber Co., Charlestown, S. C. Write for prices and literature.

Nugent's Shaft Oiler prevents accidents as it does the job from the floor, saves oil and time and reduces danger to a minimum. The can holds two quarts of oil and is made of very heavy material. The pump, barrel, plunger and ball check valves may be examined, repaired, replaced or recleaned at any time, as all parts are easily accessible. The opening for the long spout is tapped one-quarter of an inch (pipe tap), so by using an elbow or a 45 degree L at this point the spout may be set at right angles or 45 degrees. The curved nozzle at the top end may be changed to suit conditions.

Manufactured by Wm. W. Nugent & Co., Chicago, Ill. Write for prices and literature.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The **Puritan Inlet Gasket** is designed to facilitate the connection of auxiliary air valves, moist air devices, primers, decarbonizers. They replace the ordinary gaskets between the carburetor and manifold and are made of solid brass, machined to a perfect surface. The inlet hole is bridged, insuring strength, and is so placed that the auxiliary charge is mixed thoroughly with that of the carburetor. The use of this gasket does away with drilling and tapping and is very easy to attach, it being unnecessary to disconnect gasoline feed pipe or hot air tube. By fitting a pet cock to the inlet gasket it can be made into a very efficient decarbonizer by attaching a rubber tube with the other end in a pail of water. When the engine is warm and running slowly about two quarts of water is fed into the engine every 500 miles. The gaskets are tapped ready to receive a standard one-eighth inch pipe or tubing connection. In ordering it is only necessary to state size of carburetor or to give make and model of car.

Manufactured by the **Puritan Machine Works, Stoneham, Mass.** Write for prices and literature.

The **Universal 22-Ton Auto Press** has a high power leverage, starting at 2200-1 pounds and automatically increasing at the end of stroke to 5000-1 pounds. This is obtained by the lever fitting into the socket on ratchet block. The pawl uses the same notches in hand wheel and tremendous pressure is obtained on the screw with little effort. An important feature of this press is that the screw being exposed at the top may be struck a sharp blow in obstinate cases, such as a rusted shaft, which pressure alone will not move. With maximum pressure the jar of the blow does the rest. No damage to the press will result, as it is designed to withstand such a blow. The low power leverage of (1000-1) is 10 times quicker than a ratchet. This press is self contained and can be moved about to suit conditions or turned over for pressing long work.

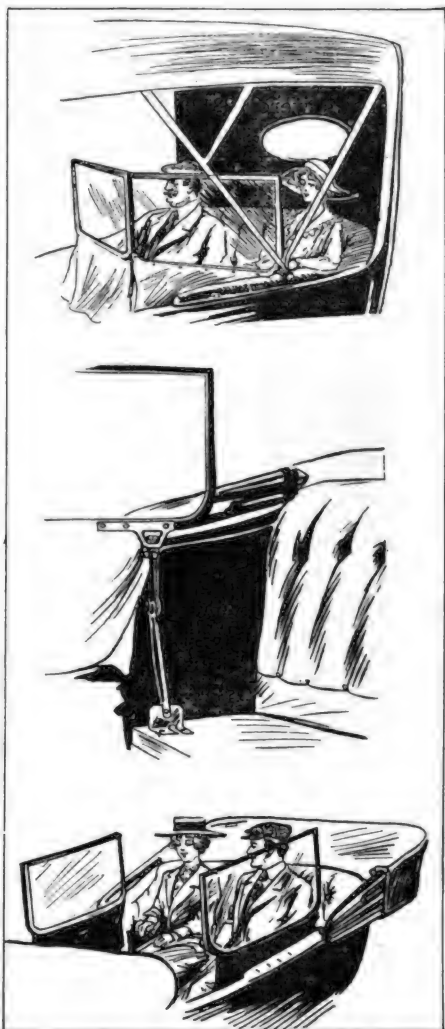
Manufactured by the **United Engine and Manufacturing Co., Hanover, Pa.** Price complete, \$55. Write for literature.

The **Manley General Utility Garage Crane** combines a half dozen different tools into one and may be used for a hundred different purposes in the garage and outside on the road. It can be mounted on a truck, chassis or service wagon for use as a general wrecking crane, or if no truck is available it may be taken apart and placed in a touring car and at the scene of the wreck may be set up in five minutes by two men. It takes up little room when in use. As a portable floor crane it will lift the front and rear ends of automobiles or transport any piece such as the engine, transmission, etc., on its own wheels anywhere. Its capacity as a floor crane is $1\frac{1}{2}$ tons; as a wrecking crane, two tons.

Manufactured by the **United Engine and Manufacturing Co., Hanover, Pa.** Write for prices and literature.



Manley General Utility Garage Crane.



The Clark Tonneau Windshield.



Universal 22-Ton Auto Press.



The B. F. S. Electric Valve Grinder.

The **Clark Tonneau Windshield** eliminates the strong wind pressure and the clouds of dust which often envelop those on the rear seat. The windshield is easily attached without disturbing the upholstery on the car. When it is not in use it is turned back out of the way, but can be brought into service by a slight pull.

Manufactured by **A. N. Clark & Son, Plainville, Conn.** Write for prices and literature.

The **B. F. S. Electric Valve Grinder** is a compact portable motor driven device designed for grinding the valves of all internal combustion engines in a shorter length of time than is required by ordinary hand methods. The familiar oscillating motion employed in hand grinding is used by the grinder, which gives 800 to 900 oscillations per minute, a speed not obtainable in hand work. The gears are packed in grease, thus insuring perfect lubrication and noiseless operation. The switch placed conveniently in the handle is actuated by a slight pressure of the finger, starting or stopping the motor instantly. This machine weighs less than five pounds, which the makers claim is the right weight for ordinary valve grinding, and a light pressure is only necessary in cases where valves are badly pitted. Each grinder is fitted with an eight-foot cord and plug to fit the usual lamp socket and standard machines are made for 110 to 130 volt alternating or direct current. These are furnished in higher voltage if specified. Bits for standard slotted or pin hole valves complete the outfit.

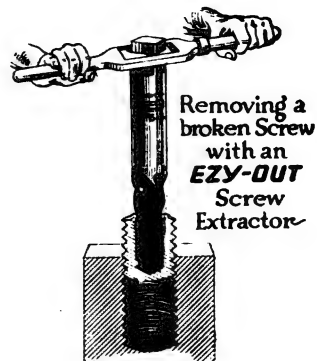
Manufactured by the **B. F. S. Manufacturing Co., 54, Hermon St., Worcester, Mass.**

The **Burn Oil Device** for attachment to the Ford car carburetor makes possible the use of kerosene. The engine is started on gasoline, then the three-way valve turned, kerosene admitted and the engine run on kerosene. In addition to this, water is admitted to the manifold through a needle adjusting valve. The whole device is simple and easily attached, the makers claiming a 50 per cent. saving on the cost of fuel.

Manufactured by **Burn Oil Device Co., Inc., 129 N. Jefferson Ave., Peoria, Ill.** Price complete, \$30.

Ezy-Out sets, as the name implies, are designed for the extraction of broken screws, studs and other parts which are held in place by threads and which have their heads broken off so that the screw driver or wrench cannot be used in removing them. As the accompanying illustration shows these tools enable one to do a quick, clean job without loss of time or temper, as it is only necessary to drill a hole in the broken piece, insert the "Ezy-Out" tool and the broken section can be unscrewed on its own threads without endangering the threads in the original hole.

Manufactured by the **Cleveland Twist Drill Co., Cleveland, O.** Write for prices and literature.



Removing a broken Screw with an Ezy-Out Screw Extractor.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

Trucks Mount Guns For Defense of Navy Yards

Mobile artillery that can be quickly moved and stationed wherever necessity shall require is essential for the protection of cities where there is reason to believe that attack may be made by enemy aircraft, and the United States government has made provision to safe-



Aircraft Defense Gun Mounted on a United States Truck for Use in Coast Protection Service.

guard different communities and necessary military and naval bases with rapid firing guns that can be trained at practically any angle.

The defensive equipment includes artillery mounted on the decks of heavy power trucks that has accurate range of three miles, and these guns are regarded as the best that ordnance engineering has produced. The accompanying illustration is of one of 17 United States truck chassis on which is mounted a gun unit, recently added to the defenses of the Brooklyn navy yard at New York city.

STUTZ MOTOR CAR CO. EARNS \$5.30 A SHARE.

The statement of the Stutz Motor Car Co. of its earnings for the last six months showed a net profit of \$398,066 as compared with \$621,775 in the same period last year without allowance for

the 1918 Federal taxes. These earnings are equal to \$5.30 a share compared with \$8.29 a share for the corresponding period in 1917. Net sales fell off \$553,665, but costs declined only \$331,753. Gross profits were \$221,912 under those at the same time last year.

AMAZON RUBBER CO. TAKES OVER O'NEIL TIRE ACCESSORY BUSINESS.

A recent development of considerable interest in the tire world is the purchase of the tire accessory business of the O'Neil Tire and Rubber Co. by the Amazon Rubber Co. of Akron.

In discussing the matter L. J. Schott, general manager of the Amazon Rubber Co., stated:

"Mr. W. J. O'Neil was the pioneer manufacturer in his field and for over 10 years produced high grade line of tire accessories, which have enjoyed a nation wide distribution and have been decidedly popular with every dealer in the country.

"The purchase includes the exclusive right to the name 'O'Neil' as an accessory trade name, all unfilled orders on hand and the good will of their trade.

"We realize that there will now be a crying need for dependable tire accessories, which will enable the car owner to secure every possible mile of service from his tires, on account of

the decreased production and the necessity of conserving the rubber supply of the country.

"We will conduct this new addition to our business on a much broader scale, and under the name of 'O'Neil Pioneer Accessories' will place before the trade the highest quality reliners, wing blow-out patches, lace-on boots, cementless patches, etc."

BEARINGS SERVICE BRANCH AT BOSTON IN NEW HEADQUARTERS.

The branch service station of the Bearings Service Co. in Boston has been moved from 835 Beacon street to 19-23 Jersey street, where it will have more commodious quarters and will maintain better service facilities for cars and trucks equipped with Hyatt, Timken and New Departure bearings.

NEW PRICE LIST ON KISSEL PASSENGER CARS AND TRUCKS.

The Kissel Motor Car Co. has issued a new price list on the new Kissel passenger car and trucks models, listing the various models as follows: Kissel Silver Six four-passenger tourster, \$2550; seven-passenger touring car, \$2550; four-passenger speedster, \$2550; Kissel Hundred Point Six five-passenger touring car (not built for "all-year top"), \$1644.50; five-passenger Gibraltar touring (built for "all-year top"), \$1743.50; five-passenger "all-year sedan," \$2128; three-passenger roadster, \$1644.50; four-passenger roadster, \$1743.50; four-passenger "all-year coupe," \$2128; five-passenger Victoria with detachable town car top, \$2475; four-passenger "all-year sedan," \$2293.50; four-passenger sedan (equipped with new semi-Victoria top only), \$1853.50; five-passenger staggered door "all-year sedan," \$2293; Kissel trucks, general utility, \$2073; freighter, \$2832.50; heavy duty, \$3905; "dread-naught," \$4785.

Manufactured by the Peoria Auto-Kot Co., Peoria, Ill. Price, \$12 each, adaptable to any four, five or seven-passenger car.



Write for literature and descriptive matter.

The "Any Kar" Auto Kot is a simple and effective means of converting a car into comfortable sleeping quarters. This cot rests on the top of the rear and front seats. A "U" shaped brace which is adjustable and has two curved plates that rest on the top of the front seat, supporting same and allows the canvas to be free. Two cots will fit into any five or seven-passenger car. Each cot will accommodate one person. The "Kot" is furnished with a heavy ducking that is laced on the under side, making it comfortable. It is hinged in the middle and folds to a small package and can be carried the same as a suit case while touring. The frame is made of 1/2-inch galvanized tubing, braced in two places to hold it rigid. When worn, the canvas can be replaced at little expense. The "Kot" weighs complete less than 15 pounds and will hold 500 pounds.

(Continued from Page 27.)

ground in, the light valve springs gave a very quiet valve action and the engine was very much better in regard to economy of fuel than our former engines.

"The acceleration on opening the throttle is remarkable and all these attributes are present and are very apparent to the driver of the car fitted with this engine, as compared with our 48 B-4 model. The acceleration is very much more rapid. The power is very much greater, hills that before necessitated a change of gear can be mounted on high.

"The speed of the car is much greater and the miles per gallon are much increased, and with all this the engine runs much cooler, so much so that the same size of radiator is almost too large for the new model.

"The dual valve six engine has dual valves. In other words, each cylinder has double intake and double exhaust valves. This enables a maximum explosive charge and a maximum scavenging of the cylinder. Thus equipped the engine develops 40 per cent. more maximum power and is 30 per cent. more efficient than previous similar sized engines.

"The acceleration from 10 to 60 miles per hour is 20 per cent. greater than in former models. While the car has 11 per cent. more speed, there is an increase of 11 per cent. in the miles yielded by each gallon of gasoline.

Production of Fords Is Suspended Entirely

The Ford Motor Company Will Devote
Its Entire Facilities to Govern-
ment Work.

The Ford Motor Co. has announced that production of Ford motor cars has been entirely suspended and that the company will devote its entire facilities to government work.

Henry Ford is now one of the largest producers of munitions in the country, having large contracts for Liberty engines, Liberty engine cylinders, helmets, ammunition carriages and Eagle boats, which will be used to chase the U boats from the seas.

RAILROAD ADMINISTRATION OPENS CONSOLIDATED OFFICE.

Furthering its policy of economy, the United States railway administration opened a consolidated ticket office in Cleveland, Aug. 12.

Centrally and conveniently located in the Hotel Winton building and next door to the entrance of Hotel Winton, this office handles tickets, Pullman reservations, etc., for all railroads in Cleveland. The formal opening was attended by city officials, representatives of railways, Chamber of Commerce and Chamber of Industry. In the accompanying illustration Mayor Davis is shown purchasing the first ticket. As a result of this consoli-

Fuel Administrator Garfield May Fix Price of Gasoline

United States Fuel Administrator Garfield has announced that he expects soon to fix a price for gasoline for consumers, as well as the government and the Allies, at a figure lower than the present market price. He is awaiting further reports on the situation before taking definite action.

Dr. Garfield's announcement disclosed

dation the Federal railroad administration has ordered all other downtown ticket offices closed. An office force of 35 is necessary to handle the volume of business, which amounted to \$15,000 the first day.

The consolidation affects the follow-

the fact that for some time consideration has been given the problem of bringing the price of gasoline to a lower level. Several reports have been made to Mark L. Requa, director of the oil division of the fuel administration, and it was intimated that upon completion of the investigation now being conducted immediate action would be taken.

"is that tightening the Ford fan belt is made too convenient. It is such an easy matter to tighten the belt a half turn that some owners get in the habit of doing it every time the hood is raised or every time they start out for a ride. This is done with the misguided notion that a



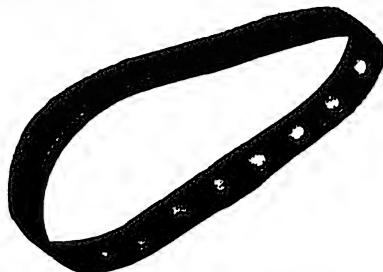
Consolidated Ticket Office in Hotel Winton Building at Cleveland, O.

ing roads: Big Four, New York Central, Erie, Baltimore & Ohio, Pennsylvania, Nickel Plate, Wheeling & Lake Erie.

Office hours are from 8:30 a. m. to 5:30 p. m. On Saturday the office closes at 1 p. m., after which hour tickets can be purchased only at passenger stations.

CONSTANT TIGHTENING RUINS ANY FAN BELT IN A FORD.

"The fan belt is a source of untold annoyance to many Ford owners and the biggest cause is—Mr. Owner himself." So says an official of the company that makes Cork Insert Fan Belts. "Perhaps the true cause of the trouble," he adds,



The Cork Insert Fan Belt.

tight belt is an efficient belt. The Ford owner knows that the water in his radiator frequently boils. He knows that this is often caused by a slipping fan belt. But there is such a matter as overdoing a good thing and the tightening up habit comes under that head. There is just so much stretch in a fan belt. Any belt when stretched beyond its normal limit is on the road to ruin. Its service from then on will be one of constant dissatisfaction. Cork Insert Fan Belts are designed to give perfect service without the need of their being stretched taut. If properly used they will not stretch and never will slip. In other words, they give perfect service when run quite loose. The looser you can run a fan belt the longer it will wear. We are even attaching pasters to Cork Insert Fan Belts giving just this kind of advice."

An interesting booklet has just been issued by the Advance company telling about their transmission lining and fan belts for Fords, and a copy can be secured by addressing the Advance Automobile Accessories Corporation at 56 E. Randolph St., Chicago.

War Industries Board Advises Suspension of Winter Shows

The War Industries Board has urged that all plans for automobile shows be abandoned for the coming winter. The announcement was made in a statement authorized by B. M. Baruch, chairman of the board. The statement is as follows:

The National Automobile Chamber of Commerce has cancelled the national automobile shows of 1919 to have been held during January and February in New York and Chicago, at the request of Bernard M. Baruch, chairman of the War Industries Board, and George N. Peek, Commissioner of Finished Products.

Going further to meet the views of the War Industries Board, the automobile industry leaders have urged promoters of local shows for automobiles,

War Industries Board to his Chamber of Commerce and Mr. Peek has received from Mr. Reeves, general manager of the chamber, a letter stating that the directors of the chamber concurred unanimously in the opinion of the board and has adopted the following resolution:

"Resolved. That the promotion of national automobile shows during the winter of 1918-19, with consequent use of transportation, fuel and labor, would, in the opinion of this board, be inconsistent with the patriotic obligations of the industry and that, therefore, national shows be suspended until further action of the association.

"Resolved, That for reasons expressed in the foregoing resolution, promoters of local and other shows be respectfully re-

Every live dealer in automobile supplies knows the value of artistic and strong window displays in moving his goods and any line of merchandise that is given this kind of support moves from the shelves far more rapidly than if left there to sell itself.

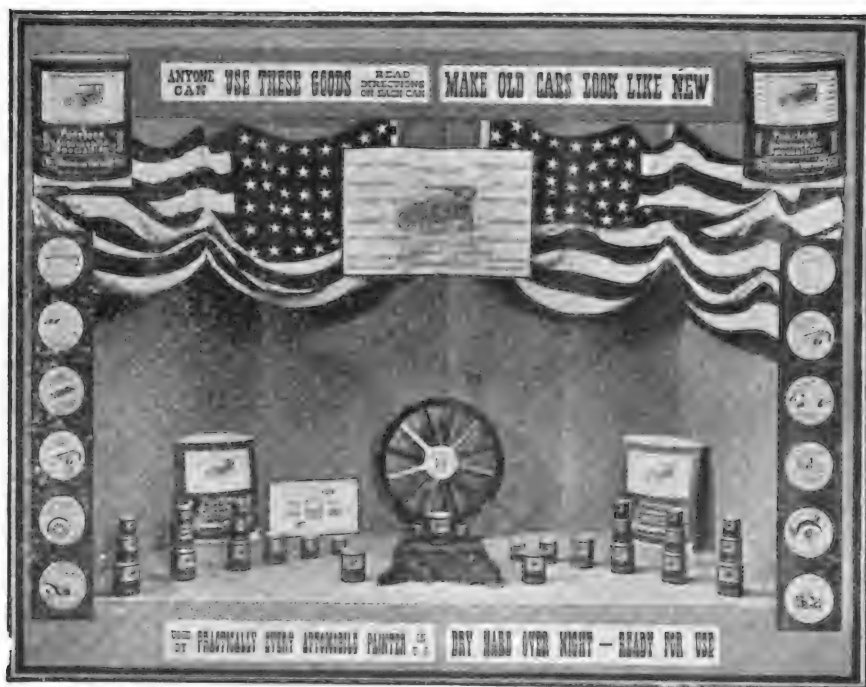
A TRUE CAR REFINISHER THAT AN AMATEUR CAN USE.

There has always been a demand for a satisfactory car refinish that could be used by the average man with good results, but nothing on the market seemed to fulfill these requirements, as most every article that would really renew the finish and give it the appearance of a new car called for the work of a skilled artisan in applying it and an outlay of money that few people wished to make on an old car or even on a new one.

Polishes, cleansers and restoratives do not really fill the exact requirements of the demand that calls for something that will practically duplicate a finish such as was on the car when first purchased, but that would not require the time, labor and cost that is incident to reproducing an absolutely new appearance. To meet this demand, after carefully analyzing the requirements of thousands of dealers and users for a product of this kind, the Panvar company of Philadelphia placed on the market, Panvar, a finish which not only restores the appearance of the body, wheels or any other highly finished part to its original luster and keeps it that way for a season, but one that can be applied by anyone who can use ordinary judgment in wielding a paint brush. It has a number of qualities, without which its application with skilled results would be impossible, as it is self-leveling and will, therefore, not show any streaks, brush marks or lapped coats, defects that would show up in any job of complete refinishing if done with ordinary material by an unskilled person. Having also a transparent quality it can be applied over any color, without dimming its hues, but enhancing their brilliancy to a degree equal to their original luster. This feature also tends to avoid the danger of making a sloppy job in its application as no harm is done where it is applied over other parts. It does not show on plated parts, yet serves as a rust preventive and if applied to tops acts as waterproofing. Age or exposure to light will not mar its effects, as it is guaranteed not to crack, craze, peel, discolor, turn white or flake off.

It dries hard over night, which makes it unnecessary to go to the trouble of providing a dust proof room in which to store the car until ready for use, as would be required in applying ordinary finishes where it was expected to obtain the same results.

Since its appearance on the market it has enjoyed a large and increasing volume of sales, a fact not surprising when it is considered that it possesses so many meritorious qualities and the ones that meet the demand of the times and the demand at this time for a refinisher for automobiles is greater than it ever was before and within the course



Suggestion for Window Display of Peerless Automobile Specialties, Made up of Cut Outs, Streamers, Signs, Wheel and Center Design Furnished by Columbus Varnish Company to Dealers.

trucks or accessories to abandon all plans for such during the coming winter.

The reason given to the industry for this action by the Automobile Chamber of Commerce is a desire to cooperate with the War Industries Board in plans for conservation of fuel, labor and transportation.

The question of advisability and practicability of holding these shows, both national and local, was taken up with Messrs. Baruch, Peek, Alexander, Legge and Judge Edwin B. Parker of the War Industries Board, by Hugh Chalmers and Alfred Reeves of the National Automobile Chamber of Commerce, and Mr. Peek strongly urged that all such exhibitions be abandoned for the winter. Mr. Chalmers presented the views of the

requested not to hold automobile, truck or accessories exhibitions during the winter of 1918-19."

WINDOW DISPLAY MATERIAL FOR PEERLESS SPECIALTY DEALERS.

The Columbus Varnish Co., Columbus, O., manufacturers of the "Peerless Automobile Specialties," are distributing their new fall window display matter, which is put out for jobbers, dealers, hardware and automobile supply houses. This material includes cut outs, streamers, center design, signs and wheel showing various colors, all of which can be combined in a very attractive display as shown by the striking window design in the accompanying cut.

of six months will increase amazingly, as practically every one of the 5,500,000 car owners will be directly or indirectly in the market for some means of keeping their cars in shape. There will be few if any new cars next year and whether a man intends to sell or keep his car he will want it in tip top shape, as its condition will affect its value and car values are going to be much higher.

Another factor in the phenomenal sales that this product has met is found in the price, which is negligible, a quart, which sells for \$1.50, being sufficient to give one car a coat, and this is usually sufficient unless a finish has become very shabby. To a man who wants to refinish his car this price would not be a factor and its other exclusive features make it readily saleable if they are simply brought to the attention of the purchaser.

Many dealers already have stocked with Panvar, but the Panvar company to be sure that anyone interested gets an opportunity to test their product and prove to their own satisfaction why the company is so willing to give it a broad guarantee, will send a trial sample upon the receipt of 10 cents to cover the cost of mailing.

The Panvar offer to the trade is exceptionally liberal and more dealers can be taken care of.

WALKER-VALLANCE, LTD., HAMILTON, ONT., ENTERS JOBBING FIELD.

The firm of Walker-Vallance, Ltd., Hamilton, Ont., are notifying new accessory jobbing houses and manufacturers of automobile accessories that they have entered the jobbing field. W. C. Hunter has been placed in charge of the wholesale department and is assisted by a staff of salesmen.

STUDEBAKER CORP. WILL STOP PRODUCTION OF PASSENGER CARS.

The Studebaker Corporation, South Bend, Ind., will cease the manufacture of passenger automobiles as soon as the present stocks of materials have been worked up. The company has large munition contracts, which will require practically all of its manufacturing facilities and employees.

PRINCIPLES AND ADJUSTMENT OF TILLOTSON CARBURETOR.

The Tillotson Carburetor, manufactured by the Tillotson Carburetor Manufacturing Co. of Toledo, O., is now being used on thousands of cars, a fact which has created great interest in its principles of operation and method of adjustment.

The principle of design of the Tillotson differs little if any from other carburetors on the market, except that the Tillotson air valve itself forms the restricted passage for the air passing through the carburetor.

The restriction at the small end of the valve is predetermined to equal the

Registration of Cars In Massachusetts For 1919 To Be Started In October

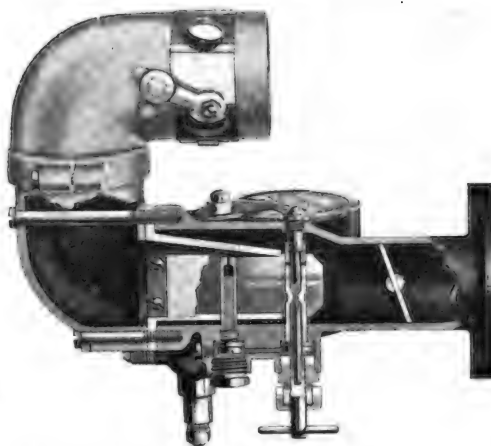
The Massachusetts Highway Commission will begin the registration of cars earlier than usual this fall. A total of about 500,000 plates have been ordered and it is expected that enough of these will be on hand so that the registration work can begin the latter part of next month. The commission will be ready to receive applications about Oct. 20 and will then make delivery of plates for 1919. As usual 5000 sets of plates will be reserved for present holders who wish to retain their old numbers.

Motorists are urged to apply for their plates as early as possible after that date to lessen the end of the year rush

and to prevent the congestion in the mails at Christmas time of mailing thousands of plates. Under the new law the commission can make deliveries of plates by parcel post, but the applicant must pay the postage. The amount to be added to the registration fee to cover postage will be marked on the new blanks.

The new plates are considerably thinner than those now in use and it is estimated that fully 40 tons of steel have been saved by use of a lighter sheet metal than formerly. The new plates will have a blue background with white letters, a combination just the reverse of that at present in use.

requirements of the motor at slow engine speeds, and at that point is located the primary fuel supplying nozzle, and that nozzle is provided with an adjustment. The secondary nozzle is located farther back and open to atmosphere so that no gasoline is drawn from the secondary at the slower engine speeds.



Tillotson Carburetor, Showing the Automatically Controlled Air Valve.

As the throttle is opened and the engine speed increases, the two flexible, yielding steel spring reeds open outwardly in proportion to the throttle. As the engine speed is increased the area through the air valve is increased in size, then the secondary nozzle commences to deliver fuel into the path of air at some open position of the throttle and continues to deliver fuel at all higher engine speeds and discontinues delivering fuel as the throttle is again closed and engine speed reduced.

The primary nozzle feeds the required amount of fuel at all slower engine speeds and reaches its maximum volume at a partially open throttle and continues to feed this maximum amount during the full range of engine speeds, therefore a single adjustment to the primary nozzle effects the mixture at all engine speeds.

The air valve having the proper re-

striction for slow engine speeds, and having its area equal to the maximum does not therefore need any adjustment, as the fuel adjustment is sufficient. The adjustment should be made very carefully and should be done when the motor is well warmed up and while the engine is running reasonably slow. Turn the adjustment of the primary nozzle up to the right just a little at a time, and keep turning it until the motor commences to slow down from lack of fuel, then turn it back about one, avoiding getting the mixture too rich.

DORT OWNERS USE CARS PRINCIPALLY FOR BUSINESS.

A recent canvas of Dort owners in the city of Detroit showed that 82 per cent. are using their cars wholly or principally in business and consider them indispensable.

"This represents about 850 Dort owners," says one of the Dort officials, "and it opens the mind to an interesting line of thought. We have no data as to just how much time these owners are saving by using an automobile in preference to other means of conveyance, but let's be ultra conservative and place it at half an hour daily. So then we have a time saving of 425 hours a day on the part of Dort owners in one city alone.

"On that basis these owners in the city of Detroit—which should be typical of this and other cities—save in a year of 300 working days, 127,500 hours.

"This, mind you, represents a saving by the owners of only one make of passenger automobile in one city. When you consider that there are about 5,000,000 cars contributing to the transportation facilities of this country, an appreciation of the indispensable utility of passenger motor cars cannot be avoided."

Barney Oldfield has been permanently suspended from the list of drivers permitted to participate in sanctioned meets of the A. A. A., and Al Cotey and Tom Alley were suspended indefinitely.

Personal News of the Industry in Brief

Frank M. Eldredge, Detroit, has been placed in full charge of the sales and advertising department of the L. V. Fletcher & Co., New York. He has been handling all the national advertising for the company for the past year and will now take on the sales department.

Mr. C. C. Powell has been appointed advertising manager of the Buda Co., Harvey, Ill., manufacturers of the Buda engine for heavy duty trucks and farm tractors. For nine years he was advertising manager of the Northwestern Expanded Metal Co. of Chicago.

Gordon G. Atwell, Nacogdoches, Tex., has been appointed by the Van Spring Oiler Co. of Chicago, their southern distributor. The Van Spring Oiler Co. is located at 222 N. Wabash avenue, Chicago, and make a complete line of Van Spring Oilers for pleasure cars. They are now working on a complete line of Van oilers for the trucks of America and will show these at the Chicago show.

Bert B. Fornaciari has been appointed production manager and chief engineer of the Midland Motor Car & Truck Co., Oklahoma City. For nine years he was secretary and general manager of the Harvey Motor Truck Co., Harvey, Ill.

W. B. Burgess, formerly assistant to Mr. Fornaciari and in charge of cost, time and stores departments of the Harvey Company, has joined the Midland forces as assistant production manager.

L. S. Nold is now associated with the Mitchell Motors Co. as secretary and treasurer. He was formerly of the Electric Vehicle Co. and also the General Electric Co.

R. T. Hodgkins, for the past four years general sales manager of the Studebaker Corp. and previous to that connected with the Yale & Towne Mfg. Co., New York, has been appointed general sales manager of the Cleveland Tractor Co., Cleveland, O.



Frank M. Eldredge, Sales and Advertising Manager of L. V. Fletcher & Co.



Emilen S. Hare, Elected Vice President of Packard Motor Car Co.

Emilen S. Hare has been elected vice president of the Packard Motor Car Co., as announced by Alvan Macauley, president and general manager. Mr. Hare will retain his position as president of the Packard branch in New York, but will remove to Detroit within a few weeks.

"Mr. Hare's successful experience, coupled with the fact that he is by nature a co-operator, will make him a valued addition to our organization," said President Macauley in announcing the election.

Emilen S. Hare's rise in the automotive industry, and particularly in the Packard company, is one of remarkable nature. He joined the Packard forces as recently as Jan. 1, 1916, in the capacity of special sales representative of both the New York and the Philadelphia branches. His success in developing national truck accounts, such as the telephone, express, oil and large mercantile business, so distinguished him that within six months he was given supervision of the truck department of the Packard Motor Company of New York. A month later he was promoted to general manager, and two months later was made president.

Under his administration he increased the business of the Packard Motor Car Company of New York, expanded its organization of sub-branches for sales and service, developed its accessory business, reorganized its used car department, completed the Long Island service station and organized its staff, and, quite recently, met the war-born problems of the Packard's biggest branch with an insight and a forcefulness that singled him out for his latest promotion.

Glenn A. Sanford is now sales manager of the rim division of the Jaxon Steel Products Co.

Wallace C. Hood, formerly general sales manager of the King Motor Car Co., has joined with James Foster in the Foster-Hood Sales & Service Co., Detroit. They will conduct a garage.

W. V. Logan is awaiting a call to service in the Naval Aviation branch. He will be trained at the Great Lakes Station. He was formerly in the Goodyear Tire & Rubber Co. service in St. Louis and later a traveler for the same firm in Europe.

J. H. Morrill is now assistant chief engineer of the Buda Co., Harvey, Ill. He was formerly in charge of the engineering department of the Northway Motors Co., Detroit.

H. B. Garman has been appointed plant manager of the Michigan plant of the Steel Products Co. Mr. Garman was formerly superintendent of the Detroit factory.

A. W. Voege is now assistant to the general manager, Maurice Rothschild, of the Regal Motor Car Co., Detroit, Mich. After the war the company will reorganize to manufacture Regal automobiles again.

J. C. Manternach, formerly manager of the rim and tube division of the Standard Parts Co. of Cleveland, is now president of the American Welding and Mfg. Co. of Warren, O.

William S. Wolfe, assistant chief experimental engineer of the Goodyear Tire and Rubber Co., Akron, O., has entered the service of the maintenance division of the U. S. Government Motor Transport Corps, with headquarters at Washington, D. C. His six years' experience in tire development with the Goodyear company well equips him for his present duties in assisting in looking after the maintenance of all tires, rims and wheels in the Motor Transport Service.

John P. Franck has recently been appointed sales manager of the Guide Motor Lamp Mfg. Co., Cleveland, O. Mr. Franck, who was formerly in charge of sales in the automobile field for the Cleveland Varnish Co., Cleveland, O., will have entire supervision over the marketing of Guide Lamp products.



John P. Franck, Sales Manager of the Guide Motor Lamp Mfg. Co.

Guy W. Morgan, former president of the Abbott Motor Corp. in Detroit, and who was in charge of the spare parts, tires and accessories for the original motor transport section of the United States army, has been appointed to similar duties under Colonel Glover in the new motor transport service.

E. S. Lee, Jr., has entered the service as first lieutenant in the motor transport service division and is stationed at Camp Holabird, Maryland. He was sales manager of the United States Motor Truck Co.

L. W. Coppock is now general engineer and chief in charge of production of the Lane Motor Truck Co., Kalamazoo, Mich. He was formerly actively interested in the organization of the United Truck Co. of Grand Rapids and the Higrade Truck Co., Harbor Springs, Mich.

H. F. Eidt is now in active service in France. He was a former member of



J. C. Manternach, President of American Welding and Mfg. Co.

Henry Abegg has been appointed to take charge of the radiator department and **H. G. Wangolin** in charge of the accessory department of the Modern Automobile Carriage Co. of Belleville, Ill.

Dr. Orrel A. Parker has been placed in charge of records under **W. F. Parrish**, chief of the oil and lubrication branch, supply section, in the office of the director of military aeronautics. He was formerly manager of the wheel department of the Hydraulic Pressed Steel Co., Cleveland, O.

W. F. Winkleman is now associated with the Heath-Duplex department of the McCord Mfg. Co., Inc. For the past 12 years he has been connected with the automobile business. Mr. Winkleman was formerly connected as special representative for the Liberty Motor Car Company.

George V. McMahan has been promoted to assistant general manager of the Remy Electric factory at Anderson, Ind. He was sales manager of the Detroit branch of the company.

Frank Jay has represented the Stanley car at Chicago for many years, as its middle Western representative, but is now located at Newton, Mass., where he

has an important executive position at the factory.

L. Clyde Smith has been appointed assistant general manager and treasurer of the Detroit Waterproof Body Co., Pontiac, Mich.

Fred Cuter has rejoined the Maxwell forces as assistant to **Harry De Bear** and will assist in a truck selling campaign to be conducted this fall. Mr. De Bear is manager of the branch in New York city.

J. B. Bleiler has become associated with the Republic Rubber Corp., Youngstown, O., as special representative.

W. J. (Bill) Slater has resigned as pneumatic tire sales manager of the Firestone Tire and Rubber Co. to become general sales manager of the Williams Foundry and Machine Co., Akron, O., the largest makers of tire building and repairing equipment in the world.

Mr. Slater's connection with the Fire-



Wallace C. Hood, Partner in Foster-Hood Sales and Service Co.

the sales department of the Continental Motors Corp. of Detroit. Mr. Eidt is also connected with the Harper Hospital unit of Detroit.

W. H. Armstrong has retired from the Mitchell Motors Co. and has taken an interest in the Armstrong Foundry Co., formerly known as the Holbrook-Armstrong Iron Co. Eight years ago Mr. Armstrong went to the Mitchell company as office manager. He has been elected president of the Armstrong Foundry Co.

J. M. Dempsey has been appointed sales manager of the Cincinnati Specialty Mfg. Co., Cincinnati, manufacturer of the Automatic Extension Reel. He was formerly with the Standard Tire & Rubber Co., Boston.

J. E. Nield, who was formerly of the Hudson and Saxon companies, has been elected second vice president of the Trego Motors Corp. of New Haven, Conn., of which he has been manager for some time.

F. L. Miller is associated with the Anderson Forge & Machine Co., Detroit, as metallurgist. He was formerly connected with the Mitchell Motors Co. of Racine, Wis.



William S. Wolfe Enters U. S. Motor Transport Service.



E. H. Broadwell, Member of War Service Committee of Rubber Assn. of America.

stone company covers a period of several years, during which time he was successively manager of advertising, sales promotion and pneumatic tire sales.

C. A. Spear succeeds **L. S. Hallowell** as New York state division sales manager for the Selden Truck Sales Co., Rochester, N. Y. Mr. Hallowell becomes affiliated with the Philadelphia Selden sales agency.

W. O. Kennington, who was assistant chief engineer of the Remy Electric Co., Detroit, has returned from the war front, where he is connected with the British Air Ministry.

J. J. Wright has been promoted to manager of the St. Louis branch of the Ford Motor Co. For the past two years he was manager of the branch at Memphis. Mr. Wright succeeds **W. C. Anderson**, who has been made manager of the assembly plant at Chicago. **C. S. Williams** of the Louisville branch becomes manager at Memphis. **W. R. Johnson** will continue as assistant manager in St. Louis.

New York Inaugurates New System of Regulating Automobile Traffic

One of the most radical steps yet inaugurated by any city in the regulation of motor car traffic has been put into effect in New York City. Congestion of traffic on the main thoroughfares in that city had reached a point where it became necessary to take some drastic action and as a result the present plan was involved through which 10 thoroughfares have been limited to passenger vehicles only and 12 to the use of commercial vehicles only.

The thoroughfares designated exclusively for passenger traffic are:

Canal street, Lafayette street to the Bowery.

Lafayette street, Duane street to Astor place.

Fourth street, Lafayette street to West Broadway.

Lexington avenue, Twenty-third street to 125th street.

Vanderbilt avenue, Forty-second street to Forty-fifth street.

Fourth avenue (Park avenue), Astor place to 125th street.

Madison avenue, Twenty-third street to 125th street.

Fifth avenue, Waverley place to 125th street.

Seventh avenue, Greenwich avenue to 125th street.

Broadway, Chambers street to 125th street.

The thoroughfares designated exclusively for commercial traffic are:

First avenue, Houston street to 125th street.

Second avenue, Houston street to 125th street.

Third avenue, Fifth street to 125th street.

Sixth avenue, Third street to 59th street.

Eighth avenue, Abingdon square to 59th street.

Ninth avenue (Columbus avenue), 14th street to 110th street.

Tenth avenue (Amsterdam avenue), 14th street to 125th street.

Park Row, Duane street to Division street.

Bowery, Division street to Canal street.

Bowery, Grand street to Fifth street.

Centre street, Pearl street to Broome street.

West Broadway, Vesey street to Third street.

Hudson street, Chambers street to 14th street.

Trucks and delivery cars may deliver or receive goods on any of the passenger thoroughfares provided they enter and leave the restricted avenue by the nearest intersecting street.

In some cases the new rules will cause delay in delivery of goods and hardships to many merchants, which will be especially felt in Fourth avenue from Astor Place to 34th street, as the greatest part of the thoroughfare within those limits is the center of the silk,

woolen and other textile trades. The Fourth avenue merchants have protested through the Merchants' Association against taking that part of the avenue out of commercial traffic use, and Commissioner Enright has been asked to modify the rules in respect to Fourth avenue and Lafayette street.

A permanently marked white traffic line has been laid in Fifth avenue just above and below 42nd street. The line is a border of white marble, about six inches wide, stretching across Fifth avenue at the building line mark on the south and north sides of 42nd street. Traffic was closed during the day on the avenue from 41st to 43rd street. The marble line takes the place of the former methods of marking with white paint the stopping limit for vehicles to permit pedestrians to cross. These painted lines did not wear well and vehicles frequently ran up close to the curb, adding to the congestion of pedestrian traffic. At the center of the marble mark and at the ends, level with the surface, thick glass plates have been inserted, which will show green lights at night, at the pressure of the traffic officer, making the dead line stop for vehicular traffic plain to drivers. Pedestrians will also be warned in crossing the avenue not to pass below the white marble line.

REAR SIGNAL LIGHTS AS FACTOR IN INSURANCE ECONOMY.

Insurance companies in giving a substantial sum off on theft insurance name the locks which may be used. It will be interesting to see whether the companies will accept other locks than are now being pushed on the market, and also whether they will take favorable action on the matter of collision insurance. K. G. Barkoot of the Chamber of Commerce building, Detroit, sole distributor of the Roedding Signal Tail Light, has appeared before several insurance heads to place the matter of reduction of insurance for collision policies, when the Roedding Signal Tail Light is used, squarely before them. Some promises of success have been gained and many have agreed to test the Roedding Signal Tail Light before making a decision.

FAMOUS ARCHITECTS MAKE DESIGNS FOR LINCOLNWAY.

Elmer C. Jensen, chairman of the Lincoln Highway Committee of the American Institute of Architects, has just forwarded to the Lincoln Highway Association headquarters designs for the rest station the association contemplates erecting at the eastern end of the Good-year memorial section of the Lincoln Highway, on the Great American Desert in Utah.

Mr. Jensen, who is one of Chicago's best known architects, has conferred

with many other well known members of his profession in the preparation of the designs for this rest station and the permanent memorial markers, which will be placed at the summit of Fisher pass and at both ends of the two memorial sections. The building itself will be long and low and in accordance with the rough character of the country, and will be planned to provide room for five or six tourist parties.

Through the active cooperation of the American Institute of Architects the story of the way in which the desert section of the Lincoln highway has been eliminated as a barrier on the trans-continental trail will be briefly told, in lasting form on the concrete and rock memorial markers to be placed at prominent points on the desert and pass.

PACKARD PLANT NOW ON 100 PER CENT. WAR WORK.

The plant of the Packard Motor Car Co. at Detroit has been placed on a 100 per cent. war work basis and its product will be confined to Liberty engines, airplane bodies, war tractors and trucks. The plant now comprises 61 buildings, which cover 56 acres of ground and gives employment to 12,000 persons.

During the period of war work the company will maintain service on the Packard trucks and passenger cars now in operation.

ADJUSTABLE EXTENSION FOR GEAR SHIFT LEVER.

Mellin's Adjustable Gear Shift Extension, as its name implies, is a reversible extension lever by means of which the operator, with a single arm movement, can shift gears easily and rapidly without changing position or moving the body. It brings control of the gearshift



lever to a position where it is handled with the same ease of effort as required to move the throttle, as the extension not only eliminates the need of reaching, but increases the leverage that is exerted. These extensions are made to fit any car and can be attached in a minute and adjusted to any position by simply setting the lock nuts tight. When ordering the make and model of car should be stated.

Manufactured by the M & H Novelty Co., 857 E. 24th St., Los Angeles, Cal. Prices, \$1.25 to \$2.

UNITED STATES NOW MAKES ITS OWN CASTOR OIL.

The scarcity of castor oil, which for a time loomed large as an obstacle to this country's ambitious airplane programme and also seriously threatened the production of important leather substitutes, has been successfully overcome, according to recent government announcement.

When the insufficiency of the castor oil supply became apparent, 6000 tons of castor beans were imported and planted last spring in sections of eight southern states, California, Cuba, Hayti and San Domingo on government contracts. The result has been exceedingly gratifying, as the crop to be harvested next month will net more than 2,000,000 gallons of first grade oil. This amount added to the supply on hand will fill all industrial and medicinal needs for a year.

Castor oil is an essential factor in the building of airplanes with rotary motors. Hundreds of such machines are on the building schedule and motors of this type must have castor oil for a lubricant.

Thousands of gallons of castor oil are used yearly in the making of leather substitutes of the pyroxylin coated type, which since the outbreak of the war have performed invaluable service in releasing leather for the country's vital military requirements. The success of the experiment of planting castor beans in this country adds another paying crop to the list in the sections named, and, in all probability, in adjoining areas. It also relieves the United States of the necessity of depending on imports for its supply of castor oil.

GASOLINE BY AIR PRESSURE.

The Apsco storage and distributing system transfers liquid by means of air pressure, directly from storage tanks to any elevation of floors and thence to automobile tanks, vats or other receptacles. All liquid passing through the system is measured by an Apsco meter, tested and sealed by the Bureau of Weights and Measures of the City of New York. The system is simply constructed and operated. The measuring device has the precision of accuracy, with the possibility of any waste eliminated. One of the most important features of the system is that the storage tanks may be filled while the system is in operation and liquid may be drawn off at any number of points where draw-off panels are located at the same time. The system can be connected with any existing air pressure system in the garage. There is no possibility of wasting a drop of fuel, as when operator lets go of lever it goes back to the shut off position. The liquid cannot be left running nor is it exposed to the atmosphere at any point within the system, nor is there any opportunity for the liquid to vaporize or for gases to collect, thus saving the full strength and quantity of liquid, also eliminating the possibility of ignition and explosion.

The liquid remaining in the system when the flow is stopped is prevented from returning to the tank by means of a check valve, which assures immediate delivery of liquid when the next draw is desired. The working tank is set lower than the storage tank in order that it may quickly fill by gravity or syphonic action as soon as the air pressure is released. The liquid and air are prevented from escaping back into the storage tank by a trapped check valve, which closes the instant the air is applied and opens when the pressure is released. The storage tank is vented to the atmosphere at all times and the working tank is likewise vented except when the panel is in operation. Panels and tanks may be purchased separately and installed by local contractors, or the manufacturers of the system will furnish an estimate for installing. Each draw off panel is operated from an individual tank, any number of which may be connected to one or more storage tanks, and the system cannot be affected by the inactivity of storage tanks, providing one remains in service. The system has been approved by the National Board of Fire Underwriters, thus assuring the lowest possible insurance rates and absolute safety from fire originating at any point in the system.

Firmly grip self-opening valve (7), thereby closing vent line, then move handle to left as far as the stop; this opens valves 6 and 11, permitting air to pass through line (8) to top of liquid in working tank, creating a pressure upon same which drives contents up through line (9) from bottom of working tank, passing through filter (10), valve (11), meter (12), discharging through hose (13) and nozzle (14), into automobile tank or any other receptacle. When required amount has been drawn, move handle to right as far as the stop; this closes valves 6 and 11, shutting off air and discharge; then release grip, permitting valve (7) to open, allowing air to be released from the working tank, which escapes through the vent line (16) to outer air. This gives working tank an opportunity to refill. Should the finger grip on valve (7) be released when handle is in left position, the air would escape up through vent, thus automatically shutting off flow, as no liquid can be discharged unless grip is sustained.

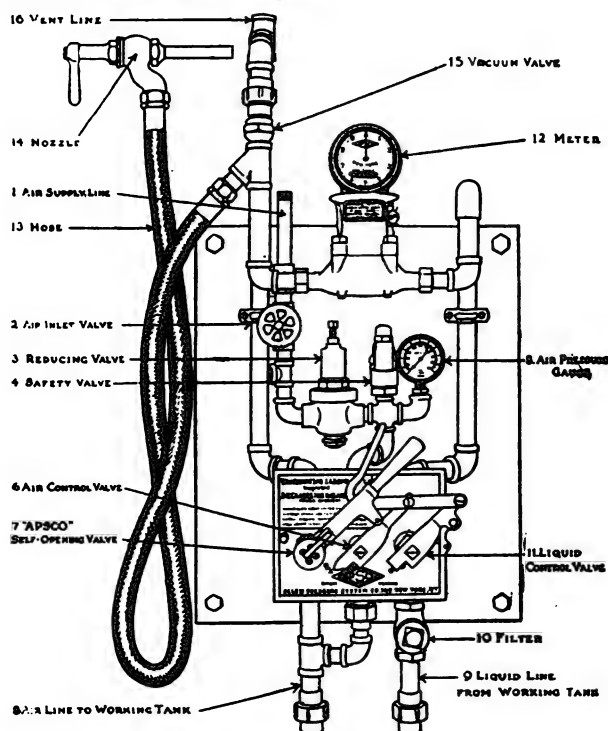
The Apsco standard draw off panel is furnished complete with unions ready for connecting to pipe lines.

Manufactured by the Allen Pressure System Co., Inc., 16-24 W. 61st St., New York City.

Lima, Ohio Junction of Lincoln and Dixie Highways

Lima, the only city in the country where the Lincoln and Dixie highways, the two greatest continental arteries of America, cross, has finally marked the junction of the two roads, which meet on the public square, in the exact center of the city.

A huge steel flag pole, 112 feet high, flying an American flag 36 feet long from its top, and, below, a service flag 20 feet long, with one blue star and the number 1345 and one gold star and the number 11, for the boys who have gone and the boys who have died, marks the junction point.



"APSCO" DRAW-OFF PANEL

The pole is set in a concrete obelisk and on its southern face is a Lincoln Highway sign, in the distinctive colors used in marking that roadway, while the eastern face displays the Dixie sign.

Ten thousand people witnessed the dedication of the pole Labor Day. Two hundred and fifty soldiers, members of Liberty truck convoys, who leave Lima every week with Lima made Liberty trucks for the trip over the Lincoln Highway to the coast, formed a guard of honor.

NATIONAL AUTOMOBILE DEALERS' ASSOCIATION GETS MEMBERS.

The National Automobile Dealers' Association during the week ending Sept. 6 received applications for over 200 memberships, although no particular effort was made during that period to solicit new members.

Highway Travel by Automobile Increased Fifty Per Cent. During the Present Summer

Highway travel by means of the passenger automobile has increased during the present summer fully 50 per cent., according to figures which have been compiled by the national road bureaus at the A. A. A. Washington and New York city headquarters. The increasing number of road journeys has resulted from overcrowded trains and the difficulty of assured accommodations and conveniences except to a comparatively limited number of travelers. While a percentage of the road trips have to do with vacation periods, a preponderating quantity has related to commercial necessities and a consequent saving in time obtained by uninterrupted door-to-door trips.

Director General of Railroads McAdoo has just issued a statement in regard to railroad travel, calling upon the public generally to use passenger-train service at the lowest possible minimum. Mr. McAdoo thus presents the case: "Among the many patriotic duties of the American public at this time is the duty to refrain from traveling unnecessarily. Every man, woman and child who can avoid using passenger trains at this time should do so. I earnestly hope that they will do so."

Chairman Carl G. Fisher of the A.A.A. Touring Board makes this comment upon Mr. McAdoo's plea: "With rail lines congested by essential freight haulage, it certainly is the duty of everyone to cut down his use of this utility, and, of course, the only answer is the highway and self-propelled vehicle, which now can show anew its ability to abridge distances and quickly transport people from one place to another in the necessary transaction of their daily duties.

"In the Middle West it is the expected thing for the average passenger car owner to employ his vehicle in practically all of his town-to-town journeys, whether they be within the state or into an adjoining commonwealth. The situation has demonstrated unequivocally the great need in every state of a state plan of state-built and state-maintained highways, and if the country as a whole were thus equipped at the present time, it would mean the saving of millions of dollars, which could be invested in Liberty bonds and other helpful forms of financing the great expenditures which we must meet.

"It is my belief that every American soldier who returns from France, after having personally seen and traveled over its great highway system, will be a forceful and persistent advocate to establish a similar situation in our country, even though it be many times the size of the prosperous nation which has benefited so thoroughly from the good

roads wisdom of a certain Napoleon Bonaparte."

CASH REGISTERS AID DEALERS.

Merchants today are facing business conditions that are without precedent as a result of the war. No business can be successfully carried on along the old lines. It must be adjusted to meet existing conditions.

The merchants of the United States have for the last few months been facing the same conditions and struggling to solve the same vital problems that

speed that is required by the present day conditions.

The war has called thousands of trained help out of the stores—the new help is untrained. At the very time that the government is spending billions of dollars and everybody has work and money, so that business is unusually good, merchants have not enough trained help to handle their trade.

That is the present problem of the merchant. How can he carry on business more efficiently than ever before, meet bigger business with less help and avoid all waste? On the way he solves this problem depends not only the extent to which he will benefit by the coming time of general prosperity, but whether or not he can with justice feel that he is doing all in his power to help win the war.

This matter is of vital importance to the merchant. He owes it to himself as well as to his country to make certain that neither his time, goods, nor money are wasted. If he is to actively cooper-



The Man Sitting at the Wheel of the Racing Car Shown Above Is Not a Dough-boy Wearing a Gas Mask, but Leigh Lynch, the Well Known Sales Manager of the Columbia Motor Truck and Trailer Co., Pontiac, Mich. This Picture Was Taken When He Was Piloting Lighter Cars to Victory on the Speedways, a Game in Which He Was Also a Leader, Having a Number of Firsts as Well as Records to His Credit in Addition to the Distinction of Being the First Man to Drive 100 Miles in Less Than 100 Minutes.

have been met and overcome by the merchants of Canada and England in the last four years.

The Commercial Economy Board asks the stores of this country to conserve man power, materials and money, and to stop waste wherever it may be found. The things the government asks the stores to save and stop are the products of old, slow, wasteful methods. They are the very things that the English and Canadian governments asked the merchants of their countries to stop four years ago.

Merchandise, overhead and operating expenses have gone up and will increase still further. In order to maintain normal profits it is necessary to cut down expenses as far as possible, stop losses, avoid lost motion, eliminate waste and work faster. No store can hold on to the old, worn-out methods and operate at the

ate with our government in this crisis and at the same time benefit himself, he must conserve labor, eliminate waste and speed up his business. He can only achieve these results by having a more efficient system than he has heretofore used.

There are two ways of learning, by experience and by observation. The least expensive way is to profit by the experience of others. The merchants of Canada and England found but one solution to this problem. That same solution has been found by progressive merchants of America. That is, labor saving machinery that will do the work of human hands. But labor saving machinery to do the work of human hands in a store must be able to do automatically a good many things that require both physical and mental effort on the part of clerks.

The cash register answers the require-

ments. Many merchants have stated that *only* through the use of cash registers were they able to continue to do business at a profit. Stores that have cash register equipment have found it easier to meet the requests of the government.

With cash registers the clerk-wrap plan can be followed by department stores. This largely does away with the need of cashiers and wrappers. The register enables clerks to make more sales. It reduces deliveries. It helps to increase business without increasing the operating force. It makes every motion count and speeds up the whole organization. It makes it possible for the stores to operate with fewer clerks. It gives quick service, which increases "takes" and decreases deliveries. It saves clerical supplies and delivery supplies. It cuts down clerical work.

Cash registers do almost everything in their particular line except talk. They help to make first class clerks out of poor ones. They are so simple to operate that even an inexperienced clerk can make correct records by simply pressing the keys. The registers show how much business the clerks do, how many people they serve and how big their sales are. They not only make clerks quick, careful and reliable, but they are themselves mechanical clerks.

The clerks have fewer steps to take; they do not have so much writing to do; they can make two sales where before they made one. These are some of the reasons why merchants who are anxious to comply with the government's request to conserve man power, materials and money and to stop waste, have found greatest assistance in cash registers.

NASH MOTORS CO. CHANGES PRICES IN TRUCKS AND CARS.

The Nash Motors Co., Kenosha, Wis., has announced price changes in Nash passenger cars and trucks, which became effective Sept. 1 as follows:

Pasenger cars: Model 681, five-passenger, \$1490; 681, seven-passenger, \$1640; 683, four-passenger roadster, \$1490; 684, six-passenger sedan, \$2250; 685, four-passenger coupe, \$2250.

Trucks: Model 2081, one-ton chassis, \$1650; 3018, two-ton chassis, \$2175; 1018, Nash Quad chassis, \$3250. All prices f. o. b. Kenosha.

WRIGHT ROLLER BEAR- INGS FOR FORDS.

From the beginning of the idea of installing roller bearings in Ford front axles, a condition confronted all manufacturers which tended to ruin the bearings after a few hundred miles running, due to no fault of the bearing itself, but to the method necessary to mount the bearing in the axle.

It was found after actual use that the shoulder which held the ball bearing was not suitable for use with the roller bearing and hence it could not be held firmly. A tendency to cock on the seat after a short time was found, which ruined the bearing.

In order to overcome this difficulty

Red Cross Wants Men With Automobile Experience To Drive Trucks And Ambulances Overseas

The Automotive and Mechanical Section of the American Red Cross, a recently created department under the direction of Major H. P. Harding, has issued a call for 1500 men with some mechanical knowledge to drive trucks and ambulances overseas.

A course of three to five weeks will be given in the training camp located in Chicago, comprising military discipline and mechanical schooling. Immediate entrainment for overseas duty will follow completion of training.

Major Harding states that while mechanical training is helpful, it is not absolutely necessary. The ambitious man

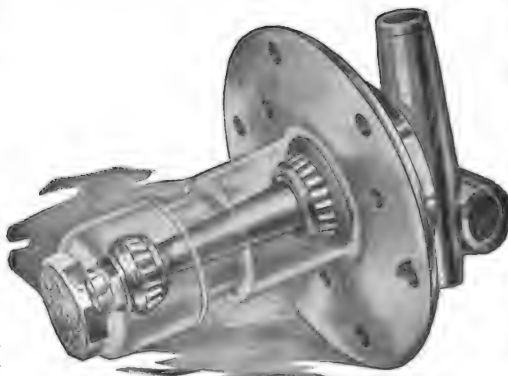
who will knuckle down to hard work for a few weeks can acquire sufficient knowledge to efficiently perform his duties if he can now drive a car. Special appeal is directed to garage and repair men, dealers and all men in the automobile industry. Monthly allowance and maintenance will be paid after date of sailing; half pay and maintenance while in training. It is very likely that this quota will be quickly filled and it is suggested that those desiring to get into this branch of the service get their applications in as early as possible.

Headquarters are at room 528 People's Gas Building, Chicago, Ill.

the Wright bearing was redesigned and a new inner ring made in such a way that another seat is made which is at right angles to the outer face and which will fit any Ford.

This feature (on which patents are pending) is possible in the Wright design alone, as other types of roller bearing cannot use this ring without changing the entire design of the bearing itself.

This new point of superiority gives



Showing Wright Roller Bearings in Place on the Ford Spindle.

the "cageless" Wright bearing further leadership in the Ford field. It is sold by the National Bearings Service Co., Broad street and Girard avenue, Philadelphia.

DE PALMA SET SEVEN OFFICIAL RACE RECORDS FOR SEASON.

While no official championship award was made this year for automobile racing pilots, the finding of the Contest Board of the American Automobile Association shows that the performance of De Palma during the season easily places him at the head of all contenders, as he has seven official new track records to his credit as compared with four established by Louis Chevrolet, his nearest competitor.

The Contest Board has announced the following records, which have been al-

lowed as official:

Non-competitive 10-mile record by Ralph De Palma at Sheepshead Bay Speedway, Aug. 24, in a Packard car. Time, 5:07.6. Official sanction No. 1103.

Competitive record, two miles, by Ralph De Palma at Sheepshead Bay Speedway, Aug. 17, in a Packard car. Time, 1:05.6. Official sanction No. 1099.

Competitive 10-mile record by Ralph De Palma at Sheepshead Bay Speedway, Aug. 17, in a Packard car. Time, 5:23.8.

Competitive 20-mile record by Ralph De Palma at Chicago Speedway, July 28, in a Packard car. Time, 10:50.2. Official sanction, No. 1097.

Competitive four-mile record by Louis Chevrolet at Chicago Speedway, Sept. 3, 1917, in Frontenac car. Time, 2:14.22.

Competitive six miles by Ralph De Palma at Chicago Speedway, Sept. 3, 1917, in a Packard car. Time, 3:21.1.

Competitive 15 miles by Ralph De Palma at Chicago Speedway, Sept. 3, 1917, in a Packard car. Time, 8:18.9.

Competitive 25 miles by Ralph De Palma at Chicago Speedway, Sept. 3, 1917, in a Packard car. Time, 14:12.72.

Competitive 75 miles by Louis Chevrolet at Chicago Speedway, Sept. 3, 1918, in a Frontenac car. Time, 42:40.28.

Competitive 50 miles by Louis Chevrolet at Sheepshead Bay, Sept. 22, 1917, in a Frontenac car. Time, 26:57.3.

Competitive 100 miles by Louis Chevrolet at Sheepshead Bay, Sept. 22, 1917, in a Frontenac car. Time, 54:20.98.

Dirt track records—Non-competitive:

Barney Oldfield in an Oldfield Special—Maxwellton, one mile circular track at St. Louis: One mile, 45 seconds; two miles, 1:30.4; three miles, 2:17.6; four miles, 3:05.6; five miles, 3:53.6; 10 miles, 7:56.2; 15 miles, 12:00.8; 20 miles, 15:52.2; 25 miles, 19:57.6; 50 miles, 40:47.6.

The Contest Board has decided that fuel tests will be permitted only when they are laboratory tests held in a laboratory and by a technical man appointed by the chairman.

(Continued from Page 15.)

with each rear wheel; then, with both wheels jacked up and with clutch in, while an assistant turns one wheel, the effect upon the other wheel should be noted. Any lost motion in the differential is liable to cause trouble, because there is "backlash" every time the car is started or brought to a stop, thus straining the gears.

While the rear wheels are jacked up test the condition of the brakes. Apply the emergency brake and see whether either of the wheels can be turned. Throw in the service brake and make the same test. If the brakes are loose have them adjusted for rigid application.

Testing the Steering Gear.

Between the steering wheel and the front wheels there should be little or no lost motion. Some manufacturers adjust their steering gears so that there is a slight amount of lost motion, but for safety there should never be more than three-quarters of an inch play in the steering wheel, which admits of easy steering. Examine the steering column

wheels and when so set should be parallel with the front wheels if the front wheels are set to a point straight ahead. Another test for front wheel alignment consists of measuring the distance between the front of the wheel and comparing this distance with a similar measurement taken from the back of the front wheels.

Turning to the examination of the springs and their suspension, each spring and leaf should be examined, both from the front and back, as a cracked leaf might show from one side, yet not be seen from the other.

Disconnect one of the secondary or spark plug wires and start the engine, running it at about normal speed. Hold the wire away from the engine casting about one-quarter of an inch; if the spark is sufficiently strong to jump this gap, then it is usually sufficiently strong for ignition purposes.

If the car is equipped with a storage battery and a lighting system, with an ammeter for indicating current furnished and used, with the engine running at normal speed, the ammeter should indicate "charge," providing there are no lights being operated. As the lights are turned on the needle will drop back toward the zero mark.

Most of the cars now on the market are equipped with generators of such a capacity that they will furnish enough current to operate all the lights in the original equipment without drawing on the storage battery. In this case the needle will not drop back to the discharge side of the ammeter until the engine is either run

reading of the electrolyte. The specific gravity of the electrolyte is proportionate to the voltage of the cell, and with a specific gravity of between 1.285 and 1.300, according to the make of the battery, the voltage should be at its maximum (approximately two volts per cell). Specific gravity readings below this figure indicate partial discharge, the drop being uniform with the voltage.

Condition of Tires.

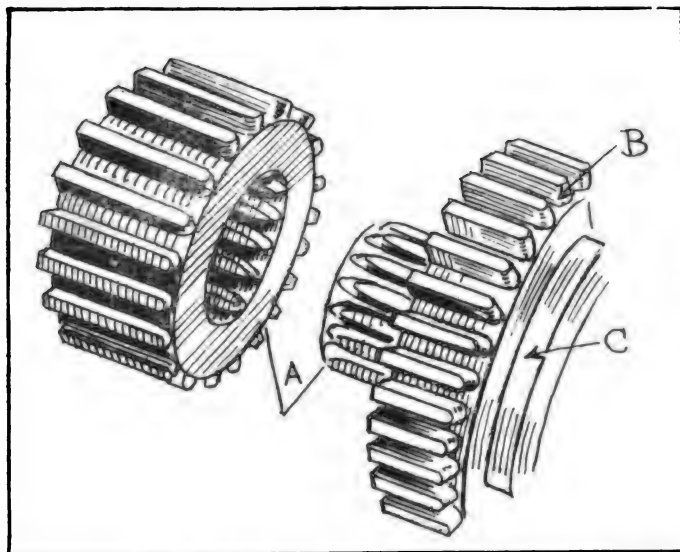
As the size of wheels increase the cost of tires increases; therefore, the value of the car is greatly affected by the condition of the tires. Extremely white and "dead" rubber is the result of age, and resiliency is lacking. Many fine short cracks on the sides of the tire indicate weak walls; long cracks that follow the outline of the rim are caused by under-inflation or running on flat tires, and such a condition depreciates the tires very rapidly. Air bubbles, sand blisters and the separation of the tread from the fabric mean that the life of the tire will be short.

The general body and chassis condition may be tested by standing with one foot on the running board, holding to the seat or top and swaying the car body back and forth. This test will indicate whether the chassis and body are together tightly, whether the general resiliency of the springs is good and if there is play how much time must be spent in tightening bolts, fenders, etc.

Details of Road Test.

If the car has successfully passed the inspection up to this point, it should be given a thorough road test at a moderate speed. Many of the defects that may be hidden from the eye proclaim themselves loudly to the ear. On this test take along an oil can and oil squeaking parts. Lubricate the springs, tighten the fenders if they are loose. If a knock is heard do not be satisfied with the explanation that it is a loose member; have the noise eliminated, then there will be no doubt as to the source of that particular sound. If it is impossible to get from one speed to another without causing the engine to labor or pound, it is a sure indication that there is a lack of power, or that there is an unnecessary amount of friction.

After the car has gained headway and the high speed gears have been engaged, it should be possible to throttle down to a speed of five miles an hour or less on level ground without causing the engine to skip, misfire or knock. At this low speed many of the defects that might remain unnoticed at any other time are noticeable. Now suddenly open the throttle two or three notches. The engine should respond immediately and acceleration should be accomplished without causing the engine to choke or knock. The performance of the car on a steep grade is largely a matter of comparison, and calls for judgment on the part of the prospective purchaser. If properly handled and the spark lever advanced or retarded in conformity with the car and engine speed, the engine should not knock until its speed is far below normal.



Worn Transmission Gears: A, Worn Teeth That Cause Loose Engagement; B, Burred Teeth That Cause Clashing; C, Worn Shift Yoke May Cause Teeth to Rub.

and be sure that it is not cracked or broken, as well as examine the castings and bracings for breaks. The steering gear linkage should be carefully inspected and if badly worn at any joint, inquiry should be made relative to possibilities for compensation for wear at the various points. Have an assistant stand with one foot against the wheel, rocking it back and forth, noting whether the spindles are loose and whether there is much wear in the wheel bearings.

Wheel Alignments and Springs.

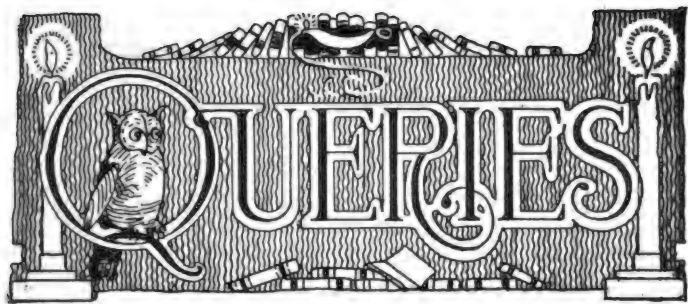
Severe strains or shocks upon the chassis might throw the rear or front axles out of line and result in excessive tire wear, difficult steering and other troubles. Two long sticks and two lengths of string make up the apparatus for detecting wheel misalignment. The strings are fastened to each end of the two sticks, equidistant from each other, sufficiently far apart so that they do not quite touch the wheels. The strings should then be set parallel with the rear

below normal or stopped.

Ascertaining Condition of Battery.

First, be sure that the cells are not cracked or broken. If the battery is one of the types that is fitted with a removable top, take the top from the battery and note the condition of the plates. In a fully charged battery, when the plates are in good condition, the positive plate is chocolate colored; the negative, gray. As the battery is discharged the plates become sulphated. This condition is evidenced by a white deposit on the plate surface, increasing in density as the battery is discharged. Excessive sulphation near the tops of the plates is an indication of air exposure, which condition results in a material lessening of battery capacity.

Before beginning the road test see that the electrolyte is brought to the proper level as directed by the manufacturer, by the addition of distilled water. After the road test take a hydrometer



NOTICE TO READERS

In this department the Mechanical Editor answers all inquiries sent in by readers concerning any information as to the repair, maintenance, adjustment, use or abuse of the motor car or any of its parts. The service is free to every subscriber. Letters should always bear the writer's name and address, and the car, part or trouble which is the subject of the inquiry should be carefully identified and described. Be sure and give name and model of car about which an inquiry is made.

Any interesting letters received, bearing on timely subjects as to the maintenance and operation of motor cars or describing new and practical suggestions for the car owner or motor mechanic, if published, will be paid for at space rates.

Address all communications to the Mechanical Editor.

WHAT TIRE TOOLS AND TIRE REPAIR EQUIPMENT DO YOU CONSIDER ESSENTIAL FOR THE CAR AND WHAT IS THE BEST WAY TO USE THEM?

(L. E. Masters, New York City.)

Best Letter.

I have toured many thousands of miles over all kinds of roads and have never yet been actually stranded through tire trouble that could not be remedied in a few minutes. This freedom from trouble has been partly due to my forehanded precautions, as well as to the fact that I always carry what I consider the necessary tire supplies and equipment to meet any emergency. I never start on a long journey without a spare tire if the shoes that are on the wheels have been run over 3000 miles, as I have found by experience that through the use of inside tire patches or complete protectors that a casing run under that number of miles can be fixed up with either the patch or protector to run to any point necessary to obtain a new casing. It has been my experience that shoes run up to 3000 miles and have not been badly cut will not blow out with such a bad tear but what they can be repaired for an emergency with either of these methods.

Frequently I have inserted tire protectors in old shoes and secured from 500 to 1000 additional miles of use from them. The secret of getting tire service I have found lies mainly with giving instant attention to every cut or puncture. When I receive a puncture or bad casing cut the attention they will receive will depend upon the need of haste. If in a hurry I will patch the tube with one of the quick working patches that require no heat or cement, or cover the cut with a boot which laces on, these repairs serving until I can get the time to vulcanize them. When I have plenty of time on the road I always stop and spend the 20 or 30 minutes required to permanently vulcanize the casing and tube cut, for which purpose I carry one of the small vulcanizers now sold, that can be used for either purpose and which occupies but a small space in the tool box and needs only the prepared heating substance that comes with it.

There are several good tire tools sold for removing tires that save time and labor and a place for them should be found in the kit in addition to several inside tire patches, protectors, prepared patches, rubber for vulcanizing and a vulcanizer that can be used instantly for either casing or tube.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

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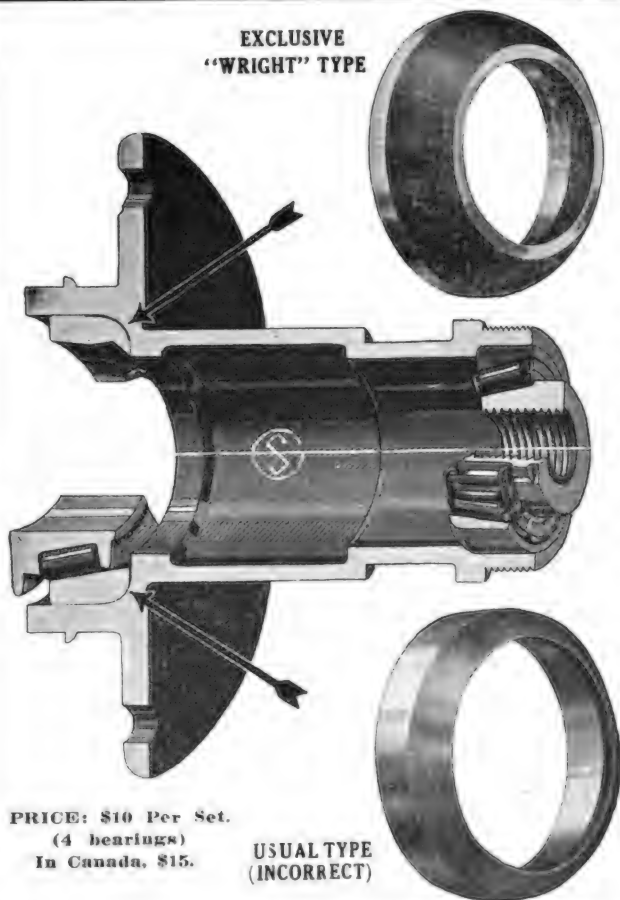


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A glance at the cuts will show the firm manner in which the Wright ring is seated in the hub and a comparison of the Wright ring (at top) with a general type of ring (at bottom) will show the radical difference in construction.

The fundamentally correct design of the Wright Bearing makes this feature (on which patents are pending) possible to the Wright type alone. No other bearing can have it without changing the entire design of the bearing itself.

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Wright Bearings are an Essential to Truck Units Using Fords or Chevrolets.

PLAY IN STEERING GEAR.

(J. H. S., Cambridge, Mass.)

I have a second hand Regal car fitted with a worm and worm wheel type of steering gear in which there seems to be quite a little play. This play I think is in the worm and wheel housing. Should it be taken up by adjusting the nut on top of the housing?

If your car is a model 4-32 the lost motion in the steering wheel is probably caused by the fact that the adjustment nut does not fit tight enough upon the top thrust bearing of the worm. To adjust this it is only necessary to unscrew the lock nut and turn the adjusting nut to the right until the play is taken up. Do not turn this nut so far as to cause a bind.

TROUBLE WITH FORD IGNITION.

(H. E. J., Hartford, Conn.)

My Ford will not run when the wire from the magneto is attached in the usual way to the magneto terminal on the dashboard. It will, however, run perfectly when the wire is changed onto the battery terminal on the dashboard and the switch turned to the battery side, though there is no battery connected to the terminal. Could you tell me if the trouble is in the coil box?

There is probably some fault in the connection between the switch and the magneto terminal on the dashboard. The switch and magneto terminal connections on the dashboard and between the switch and the accumulator terminal on the dashboard are similar. If the connection between the switch and the accumulator terminal is in good order it does not matter whether the accumulator cable or the magneto cable is attached to the accumulator terminal on the dashboard. The trouble probably rests with the contact pieces of the switch, which are easily examined. Very often owing to wear the moving member either refuses to make contact or declines to break it.

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CARE OF MAGNETO WHEN CAR IS LAID UP.

(K. E. B., Worcester, Mass.)

Is it advisable to remove the magneto when I lay my car up for the winter? Last year I did not take this precaution and had considerable trouble with the magneto when I put the car in service last spring. I would also ask the same question regarding the storage batteries.

It would be advisable to remove the magneto from the car if you intend to lay it up this winter unless the garage or place where you intend to store it is very dry or will be heated thoroughly. Put the magneto in a dry place, for if exposed to dampness, such parts as the high-tension collector and distributor become coated with moisture and in the contact breaker the fiber brush is liable to swell so that a little difficulty might be experienced in starting up the engine when—at the end of the war!

If it be preferred, however, to leave the magneto alone when laying up the car, it should be borne in mind that some such difficulty in starting the engine in the future might possibly be caused by dampness on the magneto. Such dampness, however, formed in the winter, would probably dry off in the summer, and the same applies to moisture on the lighting dynamo and engine starter, if such electrical details be part of the car's equipment.

As to the batteries, one approaches the most difficult problem of all. If the batteries be left untouched for 12 months for instance, they will probably be ruined at the end of that time, and their condition will be fairly bad if they are only occasionally attended to over a period of 12 months.

CLEANING THE BATTERY.

(A. L. S., Boston, Mass.)

Can you inform me as to how I should proceed to clean out my storage battery and as to whether it would be advisable to turn it up and drain it thoroughly before cleansing it with a hose. Considerable sediment has collected at the bottom and I believe the battery would work better if it were removed.

Turning the battery upside down to remove the sediment

would probably injure it. The sediment collected at the bottom is lead peroxide that has been "shed" from the positive plates and precipitated.

If the battery were inverted to pour out the electrolyte the sediment would be washed between the plates and separators and around the plates so that short circuits would result. No washing that would be practical would insure the removal of the particles from the plates, and in the event of renewal of the electrolyte particles remaining on the plates would result in local action—each particle having a polarity opposite to that of the plate on which it would be fixed, and in forming in each instance a miniature cell in which charge and discharge would alternate, as between positive and negative plates. Eventually holes would be pierced in the plates from this action.

There is but one way to clean the sediment from the cells and this work should not be undertaken by one not experienced in battery repair. It is the removal of the plates from the cells, thoroughly washing the plates and jars, renewal (if necessary) of the wood separators and reassembling.

Before this is done the battery should be fully charged, which means that it should be charged until there is no rise in voltage or specific gravity of the electrolyte over a period of half an hour.

The battery cells have two terminals each and these cells are connected by different type connectors, some being what is known as "bolted" and others being "burned." The process of "burning" is really that of fusing and when the terminals are burned there is no joint, the metal flowing together.

In disassembling cells with burned connections of the pillar posts, holes are drilled with half-inch drills where the pillar straps are burned to the pillar posts, and the connectors may then be lifted off. Another method not so satisfactory is by cutting the connectors between the pillars with a hack saw.

Bolted connections may be unscrewed and require no drilling or cutting. If the tops of the cells are sealed with soft rubber gaskets the gaskets may be removed and the covers taken off. If sealed with a hard compound the compound may be softened and removed with a heated putty knife.

When the elements or plates are exposed one series of plates should be removed at a time and placed on its side with the plates vertical. These can be washed with a stream of water and any deposit on the plates that the water will not remove should be scraped off with a stick of wood.

The wood and rubber separators should be removed and if they are cracked or broken or rotted they should be replaced with new, otherwise they may be used again.

Immediately upon washing the negative plates should be placed in distilled water, for if exposed to air they will absorb oxygen and heat, and if the battery is not to be immediately reassembled they should be placed in electrolyte. The positive plates will not heat when exposed to air.

Assembling the battery, assuming the jar and the separators of each cell have been thoroughly cleaned, the element is placed with a positive plate between each negative plate, and the separators are placed with one rubber and one wood between each plate. The rubber sheets contact with the positive plates and the flat sides of the wood separators contact with the negative plates.

The bottoms of the plates and separators should be even. The plates and separators should be pressed together and squared with each other so that the assembly can be placed in the jar and seated on the bridge at the bottom. The hold down, the rubber or wooden pieces that were between the tops of the separators and the straps connecting the plate lugs should be placed, the purpose of these being to prevent the separators rising and insuring against short circuiting at the bases of the plates. The covers of the cells are then put on and resealed.

The electrolyte should be placed in the cells before the covers are put on and this ought to be about 40 points higher in specific gravity than the electrolyte that was in the cells before they were disassembled. This increase of gravity is to compensate for the water in the wood separators. If the old wood separators are used, however, the specific gravity should be the same.

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New electrolyte can be made by mixing chemically pure sulphuric acid 1.842 density, with 4¼ parts of distilled water by volume to obtain 1.200 density, and one part of acid to three parts of distilled water to obtain 1.275 specific gravity. When mixing pour the acid slowly into the water, stirring it thoroughly with a wooden or glass paddle. The solution will heat when the acid is mixed and the final reading must be made when it has cooled. The mixing must be done in a glass or earthenware vessel. If the plates have been kept wet there will be no rise of the temperature of the cells when the electrolyte is poured into them.

After the covers have been put on the cells may be temporarily connected. The plates and wood separators will absorb some of the electrolyte, so the plates are well covered.

The greatest of care must be observed to connect the positive poles of the cells with the negative poles of the adjacent cells, leaving a final and outer positive and negative terminal for the line connections.

The connections must be either burned, or if the bolted type, the pillars, connectors and nuts must be coated heavily with vaseline to prevent corrosion.

The battery must be then fully charged and the electrolyte brought to the required specific gravity. The battery should then be charged at a rate not exceeding one-fourth of the normal discharge rate, and this should be continued until both the voltage and specific gravity reach a maximum, and to be sure that this maximum has been obtained the readings should be alike for a period of not less than 10 hours. There should be an allowance for temperature variation, for the specific gravity will decrease one point for each three degrees rise in temperature and it will correspondingly increase for each three degrees fall in temperature.

The maximum gravity will be approximately 1.280 at 80 degrees Fahrenheit, and the maximum voltage should be between 2.55 and 2.70. Upon completion of the charge the height of the electrolyte should be adjusted to about one-half inch above the tops of the plates. The battery will not have its maximum capacity until it has been charged and discharged three or four times, when the specific gravity of the electrolyte should be adjusted to be approximately 1.285 when fully charged.

The restoration of a battery is a very delicate operation and in most cases it is most practical for the owner to have the work done at a battery station. Unless the most careful attention is given the work the results will be disappointing.

TIMING THE SAXON ENGINE.

(E. H. S., Bristol, Conn.)

I recently purchased a 1915 Saxon roadster and as it had been used quite extensively a number of troubles have developed. The engine gets very hot when running and lacks compression. I examined the cylinders, pistons and rings and do not find anything the matter with these parts that would explain the trouble. Could you also advise me as to how the engine should be timed?

It would appear from your statements that faulty valves or incorrect timing was responsible for the engine trouble.

Run the engine long enough to heat it up and then examine the valve clearance. The distance between the valve stem and valve lifter or tappet should be approximately equal to the thickness of a visiting card. If it is more than this the exhaust valves will not open sufficiently to allow a rapid escape for exhaust gasses and overheating will result. If it is less than this the valve may be held open at all times, resulting in lost compression and overheating.

This clearance should be measured immediately after the valve has closed. Turn the engine over with the hand crank until the first valve at the front of the engine has raised to its uppermost point, then downward until it is free from the tappet, then make the measurements. Do the same to every valve.

With the engine running at normal speed insert a screw driver between the valve spring coils and give it a slight twist so as to bring tension upon the spring. Should this procedure have an effect upon the running of the engine a new valve spring should be put in. All valve springs should be tried in this manner.

Failing to locate the trouble in either the adjustment or

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springs the valve timing should be checked off. If you look on the flywheel you will notice a number of letters, which have reference to the valve positions. Turn the engine over until the mark Ex. Cl. is on the top and directly beneath the pointer. The exhaust valve in one of the cylinders should be just closing. If this is not the case the timing gear must be removed from the camshaft and the camshaft turned in an anti-clockwise direction until the exhaust valve in one of the cylinders, which has a piston near the top of the stroke, is just closed, then the gear should be returned.

To check over this timing turn the flywheel until the mark In. (inlet opens) is at the top of the flywheel and under the pointer. The inlet valve in one of the cylinders should start to open. (The piston in this cylinder should be near the top of its stroke.)

The valves should next be inspected and should the faces or seats seem to be pitted, chances are that the leakage is through them. They should be ground into place by the use of grinding paste and a screw driver, taking care not to allow the paste to work into the cylinders or valve guides.

A frequent cause of compression leakage can be traced to spark plugs. The plugs should be coated upon the threads with a paste made of graphite and oil and screwed tightly into the cylinders. The compression union or nut, which fastens the porcelain into the plug body should be examined and screwed up tightly.

Compression leakage at gaskets, plugs, etc., may be located by putting oil upon the joints with the engine running and if bubbles arise it is an indication of leakage.

EXPLANATION OF THE FORCE FEED OILING SYSTEM. (G. F. M., Lowell, Mass.)

Please explain the working of the force feed oiling system in the Query Column of the Automobile Journal.

In this type system the oil is forced by pump pressure direct to the main shaft bearing, thence through drilled holes in the crank webs to the crank pins. The wrist pins, pistons and cylinders are supplied by oil thrown from the lower ends of the connecting rods. The connecting rods do not dip in the oil. The oil returns to the sump, or the reservoir, and is again circulated throughout the system.

TROUBLE WITH ELECTRIC STARTER.

(W. W. S., Pawtucket, R. I.)

At times my starter will not work, and again it starts at once. The wiring seems to be O. K., but mechanics do not seem to be able to remedy the trouble. It gives the effect as if the current was cut off and then suddenly starts again.

Cases of this kind have been noted where the trouble was due to one of the cables shorting against a metal part of the car. The wiring should be carefully gone over to see if any part of it is frayed or broken. Switches do not make contact on occasions. Is your battery all right? Look over the starting motor brushes and commutator.

PROPER WAY TO FIT A TUBE.

(F. C., New York City, N. Y.)

Please explain the proper way to fit a tube into a tire. I have had several pinches of late and believe this is due to ignorance upon my part in not understanding the proper way to insert and inflate a tire.

When fitting a tire, if the tube is pinched between the bead of the casing and the rim, the invariable result is an explosion of the tube. This explosion usually forces the bead out of the clinch of the rim at the point where the rupture occurs. The inference is then drawn that the envelope did not fit properly, but this probably is not true. It is more likely that two thicknesses of inner tube have become pinched under the edge of the bead, resulting in a rupture of the tube at this point, permitting the air to escape with explosive force between the outside of the bead and the inner surface of the clinch, this explosion driving the bead entirely out of the rim at that point. The trouble is not that the envelope was off size, which is seldom the case, but with the careless way in which the tube was fitted. Explosions as described will sometimes occur even when a car is standing in a garage.

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FOR FORD CARS

Aside from the Minute Demountable Wheel furnished for extra tire, a Complete Set of Stronger Hubs with More Powerful Driving Lugs are included to substitute for the regular hubs and lugs on the Ford wheels.

INTERCHANGEABLE IN 60 SECONDS WITH ANY OF THE FORD WHEELS

It Runs True on any of the four axle spindles, with no wobble to cause excessive wear on tires. Its being so quickly changed permits of transferring a front tire to a rear wheel, which custom balances the average of wear on tires all around. And this economical custom is not an onerous duty when the Hill-Smith Minute Demountable Wheel is used.

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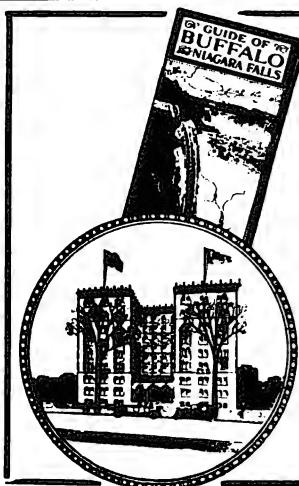
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Metal-to-metal contact in bearing surfaces causes friction. Unchecked it reduces power, increases expense and hastens the end of a car's usefulness.

Dixon's put a wear-resisting film of selected flake graphite over the metal surfaces. Dixon's alone prevent grinding and give a better-running, longer-lasting car.

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It is a good plan to test the fitting of a tube before inflating it by turning the wheel slowly and looking for any projections or unevenness of the casing. If any are found, take hold of the casing with the left hand, the palm near the bead, pushing the outer side towards the car. Then with the thin edge of a spur lever lift the outer bead and push it slightly towards the center of the rim. If any of the inner tube is visible, the tube is not in the proper position. In this event, push the thin part of the lever under the bead and force the free end of the lever downward to release the bead at that point. Then let the bead settle back in position, making sure that the pinched tube has released itself. If the tube cannot be seen at that point, continue the examination all around the wheel. Be very careful in examining that portion of the bead fitted last.

Carefully following these instructions will give you a long-lived tube.

EXCESSIVE AMOUNT OF OIL.

(E. L. M., Boston, Mass.)

I have a new car which uses an excessive amount of oil. I used a gallon to every 150 miles at first, when the lift in the pump was taken up, but still use too much. I have gone over the oiling system, but can find no defects that are apparent. Can you suggest a means of overcoming this difficulty? I have driven a long time with other cars, but never had this trouble before.

Does the engine smoke much? If there is much leakage past the piston rings you would, of course, get a poor oil performance. Remove the spark plugs and see that the electrodes are not dirty or oily. Look for leaks at the rear crankshaft bearings and at the front and around the crankcase cover joints. You should get twice the oil mileage that you are getting now. Test the compression of the engine to see if it is weak. Make a systematic search for your trouble and it should reveal the cause.

HOW TO CLEAN CELLULOID WINDOWS.

(P. A. H., Bangor, Me.)

In the issue of the Journal of July 25, on page 37, under article, "Care of the Tops," I notice that it is advised that acetone varnish be used to renew the celluloid windows that have become scratched and blurred. I have tried to obtain some of the varnish here, but nobody knows anything about it. Will you kindly advise me where same may be obtained?

Acetone varnish may be purchased at most any paint supply house. If same is not obtainable in your locality, we suggest that the celluloid windows be wiped with a woolen rag wet with alcohol and ether mixed in equal proportions. This dissolves and removes a minute superficial layer and lays bare a new surface. To restore the polish, rub briskly with a woolen cloth and finish with silk or fine chamois. This will restore the windows to their original clearness.

WHAT IS A STONE BRUISE?

(F. G. J., St. Paul, Minn.)

I have often heard the term "stone bruise" spoken of in connection with an automobile tire and would like to know just what is meant by the term, what harm results from this cause.

A stone bruise is caused from the condition of the tire when it has become pinched between a stone and the rim, rupturing the fabric. This often occurs when the car is traveling at a high rate of speed with a partly deflated tire. A stone, stick or other hard object is struck by the wheel and the tire yields and pinches the fabric against the rim, but the fabric cannot stretch and so is torn in two to four places. There is no indication on the outside that any damage has been done, but sooner or later the tire blows out at that point. A practical demonstration may be obtained by the following method:

Take a piece of old tube and fold a thin cloth four or more times and place it inside the tube; put the whole on a solid surface (a hard board will do) and strike a heavy blow with the edge of a hammer against the tube. The tube will not be damaged, but the cloth will be torn where the blow was struck.

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AUTOMOBILE JOURNAL

DEVOTED TO

OWNERS OF NEW AND USED CARS DEALERS AND REPAIRERS

VOL. LXVI.

PAWTUCKET, R. I. OCTOBER, 1918.

NO. 3.



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Now, however, our Government has urged the Paige-Detroit Motor Car Company to undertake a still greater volume of War work and to speed up our manufacture to the limit of our resources. We have no alternative and we seek none. Instant and cheerful compliance is the obvious duty of us all.

Therefore, as soon as we have exhausted the materials on hand, we shall manufacture no more Paige Passenger Cars. We shall put our organization, our factories, every dollar of our large resources, every ounce of our energy on a one-hundred per cent. War Basis. We shall give our hands, our heads, our hearts to the Service of the Colors—until the War has been won.

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AUTOMOBILE JOURNAL

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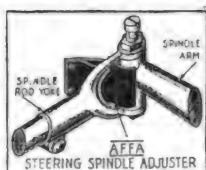
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That's a statement that will *sell* Mr. Motorist—and it's just what you can tell every one of your customers about Norwesco **“TWELVE-TWENTY,”** the non-freeze *you can test*. It *prevents* frozen radiators.

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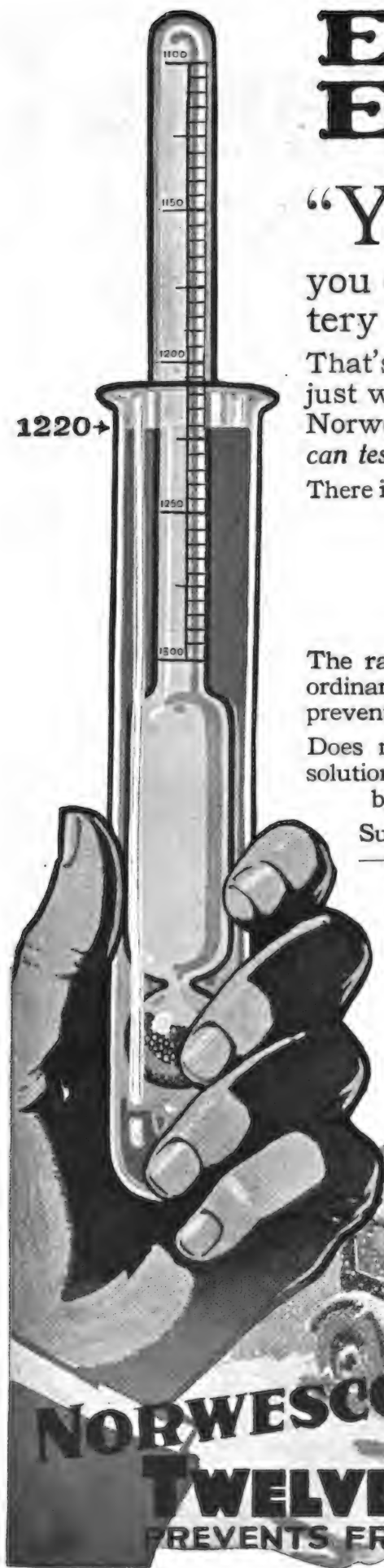
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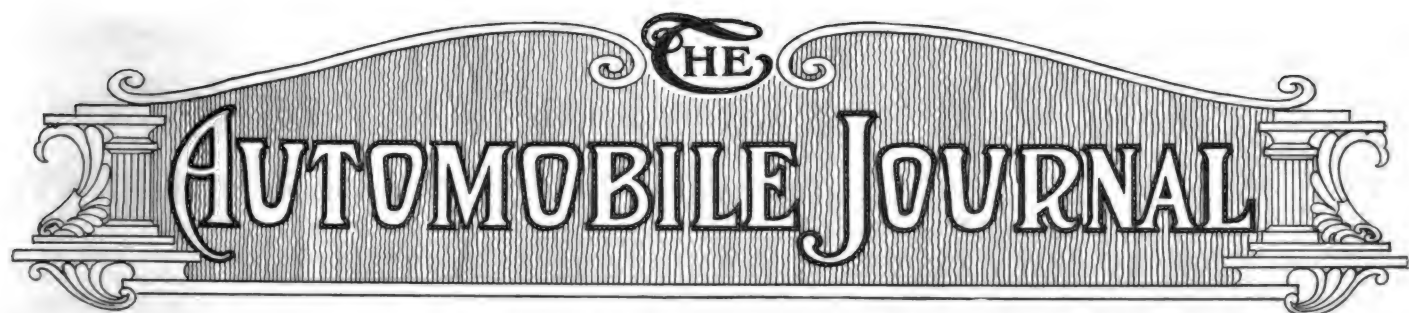
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VOL. LXVI.

PAWTUCKET, R. I., OCTOBER, 1918.

NO. 3.

Official Interpretation of Various Points in the Application of the Federal Motor Car Taxation

Where a Person Other Than the Manufacturer of the Chassis Completes and Sells An Automobile, the Tax Must Be Paid On the Complete Car, Less Any Tax Already Paid on the Sale of the Chassis—Where the Price of An Article Is Increased to Cover the War Tax, the Tax is Upon the Increased Amount—If the Dealer Adds Any Different Amount Than the Actual Tax Paid, the Tax Must Be Calculated Upon the Dealer's Total Bill.

OWING to the many different factors entering into the production of a complete automobile and the fact that there is no definite state of completion, considerable uncertainty existed as to how the new Federal taxes would apply. The fact that some trucks and some passenger cars might be delivered to dealers for sale to have bodies and other parts and equipment added to them later brought up another point of contention as to when and on what the tax would be levied, as also the point as to whether or not an advance in price made by a manufacturer to cover the tax would be included in the taxable value of the car.

Many Questions in Doubt.

These and many other questions regarding the Federal tax have been bothering dealers for some time and the National Automobile Dealers' Association, the largest organization of motor car dealers in the world, took up the matter to clear away the doubt that existed in the minds of so many of its members, particularly as to the application of the war tax as applied to truck chassis, extra bodies and other equipment.

In order to get an official construction on the matter, a letter was directed to the Treasury Department by the president of the N. A. D. A., and the following reply was received by B. C. Keith, deputy commissioner:

"Referring to your letter of Sept. 30, you are advised that automobile bodies, side cars for motorcycles, speedometers and other attachments and accessories to automobiles and motorcycles, are not tax-

able when sold separately, but they are when sold as part of an automobile or motorcycle or its equipment, whether standard or not.

Tax on the Complete Car.

"Also where a person other than the manufacturer of the chassis completes and sells an automobile, the tax must be paid on the complete car, less any tax already paid on the sale of the chassis.

"You are further advised that where a dealer, in order to reimburse himself for the tax paid by him to the manufacturer of the chassis, adds the exact amount of the tax to his invoice as a separate item, stating it to be the war tax, such amount may be excluded in determining the price for which the article is sold. But where the price of an article is increased to cover the war tax, the tax is upon the increased price. Or, if the dealer adds any different amount than the actual tax paid, no matter in what way or with what explanation, the tax must be calculated upon the dealer's total bill.

Status of Freight Bills.

"With regard to the inclusion of freight charges in the price upon which the tax is to be computed, you are informed that where the freight charges to a point of delivery are paid by the dealer, such freight charges, if billed as a separate item in the invoice to cover freight, need not be included in the amount upon which the tax is to be computed. However, as in the case of reimbursement of tax paid, if the price of the article is increased to cover freight charges, the tax is upon the increased price.

"Accordingly, where a dealer purchases a truck from the manufacturer for \$1000, adds a body costing \$400, and sells the complete car for \$1900, plus \$70 freight charges, plus \$30 war tax, or \$2000 in all, the tax is 3 per cent. of \$2000, or \$60, less the \$30 tax already paid to the manufacturer upon the sale of the truck, making \$30 tax. On the other hand, if the \$70 freight charges and \$30 war tax are billed as separate items, they need not be included in the amount upon which the tax is to be computed. The tax would then be three per cent. of \$1900, or \$57, less \$30 tax already paid on the original truck, making \$27 tax due upon the sale by the dealer of the completed machine."

Federal License Reduced.

In addition to the reduction in the taxes on motor cars and accessories, mentioned elsewhere in this issue, the Senate Finance Committee has also made a reduction in the Federal license as compared to the license tax as originally incorporated in the revenue bill by the Ways and Means Committee of the House of Representatives. This reduction cuts in half the proposal of the House bill and fixes the rates as follows:

Automobiles and Motor Trucks.

Up to 23 horsepower.....	\$5
23 horsepower and not over 30 horsepower	10
30 horsepower and not over 40 horsepower	20
Over 40 horsepower.....	25
Motorcycles	5
Electric vehicles, per horsepower....	2

Reports on Gasoline and Tire Situation Indicate Ample Supplies for All Useful Operations

Evidence of the manner in which the automobile industry is converting to war work was shown at the meeting of the National Automobile Chamber of Commerce held early this month, when the traffic committee's report showed car load shipments of automobiles for the month of September to have been only 11,700, as compared with 20,538 for the same month last year. One plant after another is converting to war work as rapidly as possible, some of them with 25 per cent. of capacity for the government, with others on a full 100 per cent. basis.

It was estimated at the meeting, at which Charles Clifton presided and which was attended by 103 manufacturers, that contracts for government work to an amount exceeding \$800,000,000 have been taken by the automobile industry, resulting in a continued curtailment of passenger car production as the work of conversion is brought about. This includes the making of airplane motors, tanks, tractors, trucks, mine anchors, trailers, guns, rifles, revolvers, recoil mechanisms, steel helmets, ambulances, field gauges and scores of other articles for the war program.

Probably no other industry in the country of a similar size or importance has sacrificed so much of its product to supply the government needs in a big way as the automobile industry, which is the third largest manufacturing industry of the country.

At a meeting of the truck manufacturers in the afternoon the makers listened to reports of the gasoline and tire situation, which indicated ample future normal supplies for all useful motor car driving.

The makers are carrying on a campaign for conservation of all kinds of materials used in automobile factories, including repair parts, with the elimination of equipment of a character not absolutely essential.

The export committee meeting reported to the chamber its plans for exports of automobiles after victory is won. Exports of the automobile industry have exceeded \$100,000,000 a year and countries throughout the world look to America to supply their needs for passenger and freight carrying vehicles. There were exports last year to 82 different countries, including 15 cars and one truck to Iceland.

At the truck meeting in the afternoon, with practically every important truck maker in the country in attendance, there was a general discussion of the government needs in trucks and the best measures for their prompt care. In addition there is an increasing demand for trucks for essential industries involved in war work directly and indirectly, which is placing a burden on the truck builders.

Victor L. Brown of the commercial vehicle committee, presided at the truck gathering, addresses being made by George H. Pride of the highways transport committee of the Council of National Defense on the work of that committee and the need for better roads, particularly for military uses.

George M. Graham spoke on "How the Motor Truck Industry Is Affected by Developments in Washington."

Other addresses included S. A. Miles on "Rural Motor Express;" H. G. Shirley on "Need for Uniform State Laws Governing the Use of Motor Trucks," and S. M. Williams, president of the Highway Industries Association, on "The Work of That Organization in Highway Matters."

The makers discussed in detail the suggested standardization of solid tires on motor trucks, wherein there will be eliminated a large number of the odd sizes that require the carrying of excessive stocks by dealers, bringing the number of sizes down to a comparatively small number, as was done in the pneumatic tires standardization plan, which resulted in the standardization of seven rims and nine sizes of tires, eliminating more than 200 odd sizes.

C. C. Hanch, chief of the Automotive Products Section of the War Industries Board, attended the meeting to tell the members of the requirements of that division and the new priority rulings under which passenger car manufacturers are permitted to balance their inventories under a curtailment of 50 per cent. from the 1917 production, to be accomplished by Jan. 1, while the truck manufacturers' production to be sold only to essential industries, is limited to one-third of their average production for the 18 months ending July 1, 1918.

Ban On Sunday Use of Gasoline Is Lifted

If Stocks Again Fall Dangerously Low Request for Conservation Will Be Renewed.

Fuel Administrator Garfield has lifted the ban on the use of gasoline on Sundays, but states that should the gasoline stocks again fall dangerously low the request for conservation will be renewed. It is also announced that priorities will probably be given for shipment of gasoline overseas, which means that the war demands will be met from stocks ahead of the domestic demand.

The fuel administration in announcing the withdrawal of the request that

motorists cease using their cars for any purposes except urgent business on Sundays, stated that as a result of the public's loyal response to the wishes of the government, 1,000,000 barrels of gasoline had been saved for military purposes.

The peak load of domestic consumption is passing, in the belief of the oil division of the fuel administration, and it is hoped that overseas shipments will not be quite so heavy. Through a priority order giving preference at refineries to shipments for overseas prompt supplies for Europe will be assured, and if any shortage exists it will be domestic.

The stocks of gasoline east of California, it is stated, have not materially increased or decreased. On Oct. 14 the stocks were 3,134,731 barrels of motor gasoline and 166,369 barrels of aviation gasoline. This represents the entire reserve and is not available for export, as it is stored in territory as far west as Wyoming and includes storage in various interior oil producing localities.

RED CROSS NEEDS 1050 MORE MEN FOR OVERSEAS DUTY.

Major H. P. Harding, Commander of Camp Scott, Chicago, the official training camp for Red Cross drivers, states that due to increased facilities at the barracks they will enlist 1050 more men for duties overseas in France and Italy.

This section is open to men under 18 years or over 45 years of age, also to men in deferred classifications. It is necessary that the applicant have at least one year's driving experience.

A course of training lasting four weeks is given, consisting of mechanical training and military discipline. The training is intensive. Military discipline is upheld always. Actual work in constructing and reassembling automobiles is given. Demonstrations of all possible accidents and break downs are shown with the quickest method of repairing.

A driving course, which has as rough as the roughest spots in No Man's Land, adjoins the barracks, and the driver is required to cover this course under all conditions, at certain speeds and with certain loads.

Forty dollars a month and maintenance, including equipment, is paid after sailing; while in training, half pay and maintenance.

Recruiting headquarters of the Automotive and Mechanical Sections, 528 People's Gas Building, Chicago, Ill.

MITCHELL & SMITH CO. CARRY BIG LINE OF GASKETS.

The Mitchell & Smith Co., Inc., 1094-92 Commonwealth Ave., Boston, Mass., are carrying a large stock of gaskets for every make of car and can fill all orders without any delay.

Dutee Wilcox Flint the Oldest Ford

Car Dealer in Point of Service

**Has the Largest Organization For Distributing Automobiles, Trucks and Tractors
In New England—Maintains Completely Equipped Service Station
in Providence and Twenty Branch Stores in Rhode Island
and Connecticut—Is New England Distributor of
Fordson Tractors and Head of Oil Company
Selling More Than 3,000,000 Gallons
of Gasoline Annually.**



Dutee Wilcox Flint in His Private Office.

“WIN the war and win it fast. Fitting one's convenience to his regular business in order to avoid a patriotic, moral duty is of secondary consideration as compared with winning the war.” These pithy statements make up the war slogan of Dutee Wilcox Flint of Providence, R. I., the oldest Ford dealer in point of service and the largest individual distributor of Ford cars.

The writer had camped on the trail of this extremely busy dealer for almost a week in an endeavor to find a suitable opportunity for an interview and thus be able to gain an impression of the personality of the man who has built up one of the largest motor car distributing

and service organizations in America. While superintending the work of photographing his large service station on Al lens avenue, Providence, I saw him daily enter into and go out of his private office. Great pressure of business affairs was impelling him toward some definite goal, and no one could have possibly diverted his attention for even a minute from the daily schedule of work he had set out to accomplish. He certainly seemed elusive—not designedly so, but as a necessity, as he is not prone to show even the attitude of evasion. He is fearless, full of initiative, and would always be a leader of men in any line of activity. At last my determination and patience to see the chief was re-

warded. He appeared to have forgotten the regular rest period, as he was still forging ahead when others had stopped for lunch. His courteous general manager, Benjamin Peckham, saw that the “coast was clear,” and projected me into the vortex of this busy man's affairs, and his relaxation of regular effort was short, for he could allow me only a few minutes of his time, but made special arrangements to give me an hour the next day. At the interview he instantly impressed me as 100 per cent. American, 100 per cent. as a motor car dealer and a creator of efficient motor car service, 100 per cent. all around business man and cheerfully good fellow.

Supplementing the war slogan quoted

above, Mr. Flint continued with the following short, snappy declarations delivered like the action of a rapid fire machine gun:

"The sooner dealers realize that the most important business before them is to do everything they can to help win the war, just so much sooner will it be satisfactorily finished and the automobile business will be back into its normal condition. I am bending all my energy and resources toward conservation and contributing to the sinews of war, and am sacrificing and adjusting my business as best I can to overcome the disintegration of my former efficient organization, in order to release manpower for the war. This may naturally reduce the productiveness of my service station, but, fortunately, at this time, only in so far as the broader distribution of passenger cars is concerned.

"It will not help dealers or those engaged in other lines of business to complain of the unsettled conditions brought on by the war. It is up to all of us to pull off our coats, roll up our sleeves and pitch in with an earnest good will to apply our energies wherever they will do the most good toward winning the war. When you have an obnoxious job on your hands, the more quickly you clean it up, just so soon will the atmosphere of discontent and uncertainty be clarified. We must work hard and fast to remove the hated barrier to civilization, peace, contentment and legitimate business—and our whole duty now is to help win the war."

A Pioneer Ford Dealer.

The Ford agency of Dutee Wilcox Flint was organized in the fall of 1904, when Henry Ford was building and marketing a two-cylinder car. Then production and sales were limited to the minimum. If a dealer sold 50 cars a year he was indeed considered prosperous, and Mr. Flint did not average that number of sales annually. Then people had to be educated to the utility of a car and how to carefully operate one. As a pioneer, Mr. Flint had his full share of this promotion and sales work. He is now 35 years of age and was only 21 when he embarked upon the tempestuous sea of the early days of a motor-car agency.

Mr. Flint was persistent and held steadfastly to his Ford agency, backed up with all the ardor and optimism of youth. It can be said of Mr. Flint that he always had implicit faith in the genius and ability of the man out in Detroit

who was destined to become the big man of the industry. He knew in advance of the great manufacturer's plans to build a light-weight car that would be easy and economical on tires as well as economical in fuel and oil consumption, with minimum mechanical upkeep expense. His faith in Mr. Ford's promise to produce the "Universal" car was not misplaced, as his rapid and wonderful success as a Ford distributor has proven.

In the winter of 1905 Mr. Ford brought out his model K six-cylinder car, and Mr. Flint sold 20 of this model in 1906 and 23 in 1907. In the fall of 1906 Mr. Ford produced his first model of the light-weight, medium-length wheelbase Ford, then designated as the model N. The touring car sold for \$950 and the roadster for \$900, f. o. b. Detroit, and it was then considered the "best buy" at anywhere near its price. During the season of 1907 Mr. Flint sold 300 of the model N. Each succeeding year his sales were increased by leaps and bounds, and the sales for the most prosperous year, just preceding the entry of the United States into the war, exceeded 10,000 passenger and commercial cars.

Territory Controlled Has 1,250,000 Population.

Dutee Wilcox Flint controls, as his selling territory, the State of Rhode Island and Fairfield and New Haven counties in Connecticut. He operates 20 stores in this territory, with service stations in all of them. Aside from the main assembling plant, service station and general offices located on Allens avenue in South Providence, the location of his sales stores in Rhode Island are: Main salesroom, 172 Washington street, Providence; Pawtucket, Newport, Westerly, Woonsocket, Arctic, Wakefield, Warren and Bristol. Salesrooms

in Connecticut are located at Bridgeport, New Haven, Waterbury, Stamford, Greenwich, Meriden, Danbury, South Norwalk, Wallingford and Derby. This territory has at least 1,250,000 population and it is one of the richest manufacturing sections in America, with thousands of miles of good roads to encourage the extensive use of motor vehicles for business and pleasure.

In connection with the 20 stores, a line of standardized accessories and supplies is carried in each, for the convenience of Ford owners, and only such accessories are carried in stock which are strictly applicable to the Ford car. Distributed among the 20 stores are spare parts valued at between \$150,000 and \$200,000. At the service station in Providence \$40,000 worth of spare parts are carried as standard stock and at the Bridgeport, Conn., service station a like amount of spare parts are carried. Between 500 and 600 bodies, mostly for commercial cars, are a part of the regular stock supply. In fact, the service plant in Providence is operated on the basis of a factory, so complete is the equipment and production facilities, and a number of cars could be built from the spare parts and bodies on hand, if occasion should demand.

Concentrating on Service Work and Commercial Cars.

Due to the Ford Motor Company's reduction of its production of passenger cars to meet the Government's policy of conservation, as well as the difficulty of securing shipment by railroad, Mr. Flint's allotment of passenger cars has been limited for the past several months, as compared with his former average of 1000 cars per month. Mr. Flint, like many other dealers, had strenuous work to do to secure even a small number of passenger cars to partially supply the demand. In order to secure and make sure of his allotments he resorted to driving the cars overland from the factory assembling branch at Long Island City, N. Y., and from the factory branch at Buffalo, N. Y.

In view of the gradual curtailment of passenger car production, the Flint organization, for the period of the war, is concentrating its efforts on assembling and equipping with various types of bodies the regular Ford commercial chassis and the Ford one-ton truck, and in employing the sales force in selling



The Dutee Wilcox Flint Ford Service Station on Allens Ave., South Providence.

them. This is a branch of the business on which attention can be centered during the war, as the commercial car and truck have not come under the ban of the Government as non-essential. Concentration along the lines of conservation particularly includes service work for the thousands of Ford owners in Mr. Flint's territory. Although the capacity of the Flint service station is not being used as extensively as it was before the passenger car curtailment, he is enabled gradually to regulate the volume of service work

loaded at the door of the assembling department.

Until recently the majority of the cars distributed by the Flint organization were received at the service stations in Providence and Connecticut points in units and then assembled into complete

and service manager, car assembling department, machine shop and repair department, paint shop and garage for the gasoline delivery trucks.

On the second floor are the general executive offices of the directing staff, presided over by the general manager, Benjamin Peckham, and the assistant manager, J. F. Peckham, Jr., who are systematic and thoroughly trained business men of broad caliber. Here also is located the private office of Dutee Wilcox Flint, and adjoining it is the office of his private secretary.



1—Office of the General Manager, Benjamin Peckham, Who Actively Directs the Staff and Carries Out Mr. Flint's Policies. 2—Accounting Department, Where the Finances Are Carefully Looked After by a Corps of Efficient Accountants. 3—In Foreground, Tractor Department Manager's Office, and Beyond, the General Offices of the Dutee W. Flint Gasoline Co., Inc., with the Manager, Alexander R. Fritz, at the Extreme Right.

according to the number of men available. At present 50 people are employed in the general offices and mechanical departments at the Providence station and 150 people are engaged in the main store in Providence and in the other branch stores and service stations. Before the curtailment of passenger car production 375 people were employed in all branches of the organization. Many of them were road men, and that loss is not felt owing to the greatly reduced supply of new cars.

Mr. Flint does a considerable business in used Ford cars, taking them in only on the established trade basis. All used Fords are put into first-class running order, the cost of such work having been predetermined by his appraisers and the charge is included in the prices at which the machines are sold.

The Providence Service Station.

The Flint service station is located within several hundred feet of the Providence river, on Allens avenue, and has a frontage of 160 feet and a depth of 170 feet. A railroad siding at the front of the building affords excellent shipping facilities for all freight. In normal times Ford car units were received at the railroad siding, direct from the Ford Motor Company's branches, and un-

cars. Under such conditions these service stations were extremely busy.

The modern service station building is of brick and cement fireproof construction throughout. The front has two stories, with general offices on the second floor and the main entrance is on the ground floor at the side. Upon entering the station one directly faces the parts and supply department, which is enclosed, with serving counter at the front. Here thoroughly trained and courteous clerks promptly serve customers. All parts, supplies and accessories are sold for cash. There is a cashier's office at the end of the counter, where all cash is received and transactions accounted for.

In front of the building on the ground floor is a large office occupied by the accounting department, presided over by Julius G. Ford, assisted by a competent force of young ladies. This office is furnished with all the modern accounting equipment. The system of accounting is free from unnecessary complication, due to all business being transacted on a cash basis.

The other departments in the one-story section of the building are: New car stock department, Fordson tractor department, office of the superintendent

Miss McTernan, who has held that position for twelve years. It is said of Miss McTernan that she is all business, with frills and foibles eliminated. It might be stated here that during the busiest periods all correspondence is dictated on the Dictaphone. The executive offices are handsomely furnished in mahogany, with all the most modern office appliances and equipment, and are separated by heavy plate glass and entirely enclosed.

The wireless tower on the roof of the service station was formerly used to carry messages back and forth between the service station and Mr. Flint's steam yacht when he and his general manager, Mr. Peckham, were off on recreation trips. This wireless station was disconnected shortly after the United States entered the war and Mr. Flint's yacht was turned over to the Government.

At the side of the building on the second floor are located the executive and business offices of the Dutee W. Flint Gasoline Co., Inc., and the office of Harvey Flint, manager of the Fordson tractor department, who is a brother of the head of the organization. He was especially selected for this department because he has specialized in agriculture. The Dutee W. Flint Gasoline

Co., Inc., although a separate organization from the Ford distributing agency, is more or less allied with the interests of the Ford agency, due to the fact that Mr. Flint felt, from its inception, that he required an efficient and systematic gasoline and oil distributing department to serve his 20 stores and service stations. This department is managed by Alexander R. Fritz,



tools they must be returned, and the habit of losing tools in this station has been almost entirely eliminated.

The Flint service station is operated on the basis of standardized operations and a flat rate of charge is made on each operation of overhaul or adjustment. By this system they have been enabled to set a uniform and consistent schedule of prices for



who is well known as an oil specialist.

The machine shop is fully equipped with modern machinery, including lathes, drill presses, acetylene welding outfit and many special tools and other machinery, a general list of which is given below and which will be of exceptional interest to those who seek to conserve in time and labor:

Connecting rod aligning block.

Piston holder for placing rings and tightening rods to wrist pins.

Triple gear block to hold gears while reaming.

Piston block to hold for reaming wrist pin bushings.

Main bearing cap oil-way cutter.

Cylinder block holder to fit crank shaft.

Cylinder block holder to fit rods and grind valves.

Electric dynamo and engine frame for running in engine, testing for oil leaks, compression, magneto output and to loosen overhauled engine before placing in case.

Transmission and engine case horse to hold these units while cylinder and transmission are on the bench.

Rear end testing motor to loosen gears and test for noise.

Reboring mill for reboring cylinder block to oversize.

Brazing outfit for welding crankcase arms and all other broken parts.

Rear end bench for holding rear end while in the process of being O K'd.

Rear end horses to hold up rear of car while the assembly is on the bench.

Chain hoist traveling on an overhead



4—The Largest and Handsomest Gasoline Filling Station of the Dutec W. Flint Gasoline Co., Inc., Located at Broad and Myrtle Sts., Providence, R. I. 5—The Main and Largest Store, Located at 172 Washington St., Providence. 6—A Section of the Sales Room of the Providence Store. 7—The Large Gasoline Storage Tanks Adjoining the Service Station, with Several of the Delivery Trucks in Foreground.

track, to lift engine from chassis and carry to motor bench and testing motor.

The chain hoist is also used to carry dirty engines to a vat of chemical solution, where they are immersed and cleaned of all grease, thus giving the mechanics a clean unit on which to work.

Specialized Tool Equipment.

The repair department is equipped with a large number of high-speed wrenches and other time and labor-saving tools (see Figs. 1 and 2). The equipment makes clear the extent of specialization carried out in this station and how all lost motion and wasted time are done away with. Most of these tools were specially designed by the Ford Motor Company to fit the particular requirements of overhauling work on the Ford chassis. The rear-end jack shown in illustration (Fig. 1) was designed and built by Joseph Lewis, popularly known in the service station as the high-speed specialist.

All tools and small mechanical equipment are kept in systematic order in a special tool room and are issued to the employees on requisitions made out and signed by the foreman of the shop. When mechanics have finished using the

all work and know in advance just what any operation of overhaul will cost. On this basis the customer can accept or reject it, and if acceptable he knows when he calls for his car what the charge will be. The basic cost of labor on each operation was predetermined by repeated practice on numerous operations, so that it was a simple problem to set a schedule of charges that are fair to all. These charges, however, are for labor only, and all parts and materials used on the jobs are charged for extra.

When a customer delivers his car to the service station for any overhaul or adjustment that he may deem necessary, regardless of what he has determined the car needs, the service manager delegates an expert tester to drive the car and determine whether there is anything else that requires attention. If he finds other mechanical defects, he makes a report on the same to the service manager, who, in turn, makes the facts known to the owner. Then it is for the owner to judge as to whether he should include them in his order for work to be done.

The details of the customer's order are placed on a shop order blank, specifying the parts and supplies to be used. Before starting on the job the shop foreman fills in a requisition blank as an order on the parts department for all necessary parts and supplies for the job, and the same are charged to the job. Every mechanic working on an operation is given a time ticket containing the shop order number, the particular operation specified, the mechan-

ic's name, number and rate per hour he receives, with columns for number of hours, amount and account number. The shop order is in triplicate, first sheet of white bond, second sheet of cream bond and third sheet of Manila cardboard, size 11x8½ inches. This heading is car-

KEY TO THE HIGH-SPEED WRENCHES AND TOOLS AND THE OPERATIONS THEY PERFORM.

- A—Clamp to put on rear springs.
1—Ratch screw driver for putting in screws on windshields and fitting up tops.
2—Gear puller for low-speed gear.
3—Bending bar for adjusting speeds.
4-5-6-7—Speed wrenches for putting on running boards.
8—Speed wrench for putting on fenders.
9-10—Speed wrench for body bolts.
11-12—¾-inch speed wrench to line transmission.
13-14—Speed wrenches for taking off cones on front wheel.
15—Speed wrench to fit into sockets in set 23.
16—Speed wrench to put on the hub bolts.
17—L wrench to put on steering post.
18-19—¾-inch T wrench to take out magneto coil.
20—Disc drum puller.
21-22—Valve resaters.
23—Monsberg socket end wrench set.
24—Flywheel wrench.
25—Wrist pin wrench.
26-27—¾-inch speed wrench for taking off engine stud bolts.
28—Speed wrench to tighten fenders.
29—Speed wrench to take off radiator.
30—Speed wrench to take off cylinder head.
31—Speed wrench for different sockets.
32—Valve grinder.
33—Speed wrench to put on brackets for rear fender.
34—Speed wrench to put on top rests.
35—Speed wrench to put on brackets for rear fender.
36—Speed wrench to put on differential driving gear.
37—Speed wrench to put on dash bolts.
38-39—Speed wrench to put on rear wheels.
40—Speed wrench to put on rear spring perches.
41—Speed wrench to put on brake shoes.
42—Tool to straighten front axle.
43—Gauge to line up front wheels.
44—Tool to straighten front fender brackets.
45—Bolt cutter.
46—Gauge to measure distance between headlights.
47—Tools to put on head and side lights.
48—Electric drill.
49—Jack to place under differential housing and raise rear end.

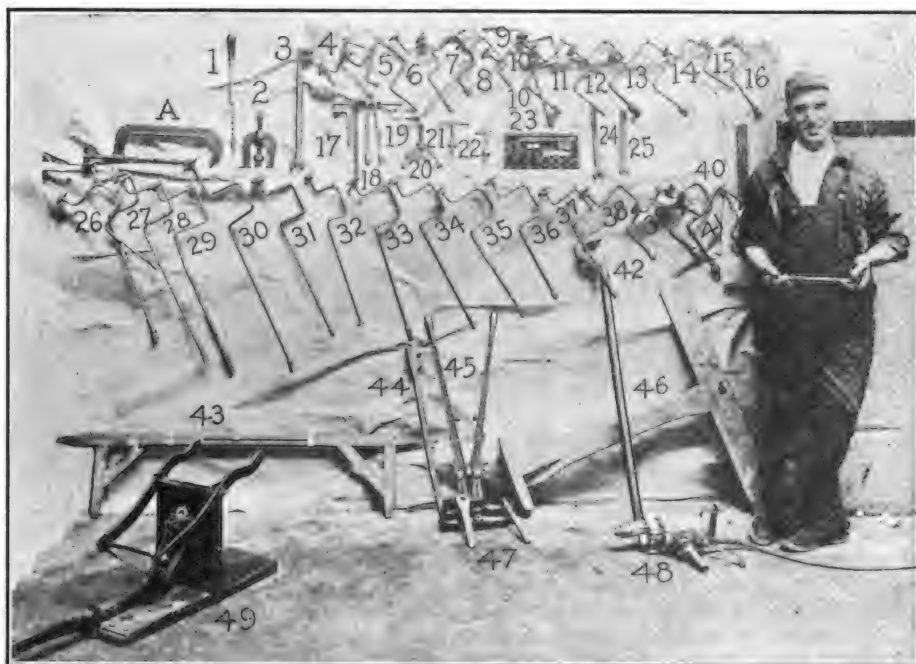


Fig. 1—High-Speed Wrenches and Other Tools Used for General Overhauling and for Building Up a Ford Car Complete. Joseph Lewis, Popularly Known in the Service Station as the High-Speed Specialist, is at the Extreme Right, Holding a Main Bearing Scraper.

original order signed by the owner: "I agree to pay for the above work in cash when ready and understand that prices quoted are for labor only, parts extra."

At the bottom of the original order is this clause printed in red: "Customer Note: All repair work is strictly cash. Estimates are for labor only, parts additional. Customers' cars operated by our staff at owner's risk. Not responsible in case of loss by fire or theft. We are not responsible for loss of tools, switch keys or other articles left in cars." The second sheet is for the shop clerk and has the same heading as the original order, excepting at the bottom of the sheet is this: "Note: When job is completed and cost is computed, shop clerk will promptly return this order to office." On the back of the second sheet of the shop order, which goes to the

shop clerk, is a form in which is carried a description of the parts and supplies used, cost and selling price and the time and cost of labor required on the job. These details are recorded on this cost sheet by the shop clerk and then it is turned into the billing department, and from the charges thereon the customer's bill is made out. The third sheet of the shop order is held by the shop foreman until the job is completed, when it is turned over to the shop clerk.

Metal Department and Body Shop.

In connection with the repair department there is a first-class radiator repair department, where all kinds of radiator repairs are made by experts, and a sheet metal department that is equipped with a cornice brake and metal folding machines, and here fenders and mud guards are repaired and the facilities

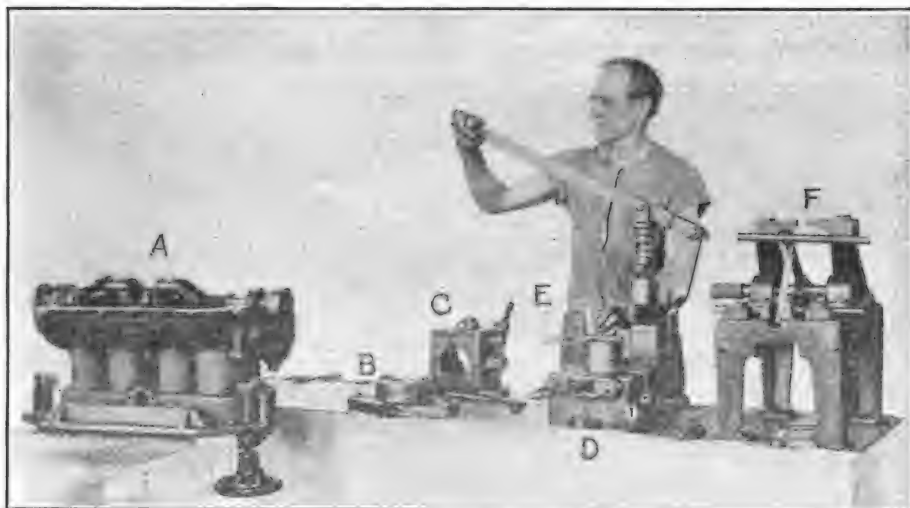


Fig. 2—Form Machines for Holding Pieces of Work. A—Cylinder Block Holder for Scraping in Main Bearings. B—Triple Gear Holder for Reaming. C—Piston Holder for Reaming Wrist Pin Bushings. D—Piston Holder for Fitting Rings to Pistons and Rods to Wrist Pins. E—Main Bearing Cap Oil Groove Cutter. F—Connecting Rod Straightening Machine.

ried on the triplicate sheets of the shop order: "Shop Order. Description of car, owner's name and address, work authorized by, shipping instructions, shop order number, date of order, date wanted." Then follow the head "Instructions," and a number of blank lines for details or order and blank lines, "Signed, Inspector," "Approved, for owner." The following clause is on the



New Car Stock Department, Where New Cars Are Held Until Delivered to Owners and Branch Stores.

are sufficient to make new fenders and guards if necessary. They also have a body-building shop where special commercial bodies are made to order; and their paint shop is as complete as all other departments. All special iron work is done in the service station. In fact, their facilities and organization of specialists are so complete that one would imagine himself in a regular motor car factory. There has been nothing overlooked or omitted that would afford the most satisfactory service, and the perfect, simple system under which it is operated has greatly reduced the cost of service to Ford owners in the territory served by the Dutee W. Flint distributing agency.

Mr. Flint has instilled into his organization a perfect order of cleanliness and neatness. At quitting time all nooks and corners of all departments must be thoroughly clean of all waste, oil and water. The same order of neatness is maintained in all the offices of the staff—no desks littered with papers, as there is a file for every important paper.

A considerable number of the Flint organization entered the service of their country. In order to instill into those remaining the necessity of more than ever concentrating their efforts and to help keep intact, as nearly as possible,

the efficiency of the original organization, the following persuasive appeal

places in the service stations and stores and the men showed a spirited response:



WAR AND SERVICE

LABOR IS SCARCE. OUR MEN ARE BEING CALLED TO SERVE THEIR COUNTRY. WE SHALL NOT REPLACE THOSE WHO LEAVE, BUT SHALL ASK THOSE WHO ARE LEFT TO WORK HARDER AND SO DO THEIR SHARE.

WILL YOU BE CONSIDERATE? IT IS ONE WAY YOU CAN HELP.

DUTEE WILCOX FLINT.



A Section of Repair Department Where Units of the Car Are Overhauled. Note the Chain Hoist in the Foreground on the Right, Holding an Engine Just Lifted from a Chassis. This Chain Hoist Travels on an Overhead Track That Encircles the Entire Shop and Heavy Units Can Be Lifted and Carried to a Number of Locations.

was printed in blue and red on a large white card and posted in prominent

New England Distributor of Fordson Tractor.

Dutee Wilcox Flint is the New England distributor of the Fordson tractor manufactured by Henry Ford & Son. Harvey Flint is the manager of the tractor department. During the past several months the tractor and its working units, a No. 7 Oliver plow and a disc harrow, have been transported on a five-ton Pierce-Arrow motor truck over sections of New England. This truck is provided with skids for unloading the outfit and it is manned by several experienced operators to handle the demonstration work.

Demonstrations of the tractor have been given to large numbers of farmers and prospective dealers. Mr. Flint, in carrying out the initial policy of Henry Ford & Son, in introducing the tractor during the summer has been contributing this great tractor educational work at his own expense and selling the trac-



Parts and Supplies Department in Service Station.

tors to farmers at the cost price, \$750. He is distributing 500 tractors at actual cost in order to encourage the immediate use of Fordson tractors to greatly aid in increasing farm production and materially help to conserve and increase the resources of New England.

On Aug. 12th the motor truck, loaded with the tractor outfit, was started on an educational and dealership campaign. The schedule of this trip covered 35 counties, with an approximate distance of 2600 miles to be covered. The Flint tractor distributing agency will carry a complete stock of tractor repair parts and maintain an unexcelled mechanical service at its service stations in Providence and Connecticut. Other tractor service stations will be established with the largest and most centrally located sub-agents.

3,000,000 Gallons of Gasoline Sold Yearly.

The Dutee W. Flint Gasoline Co., Inc., is a separate company from the Dutee

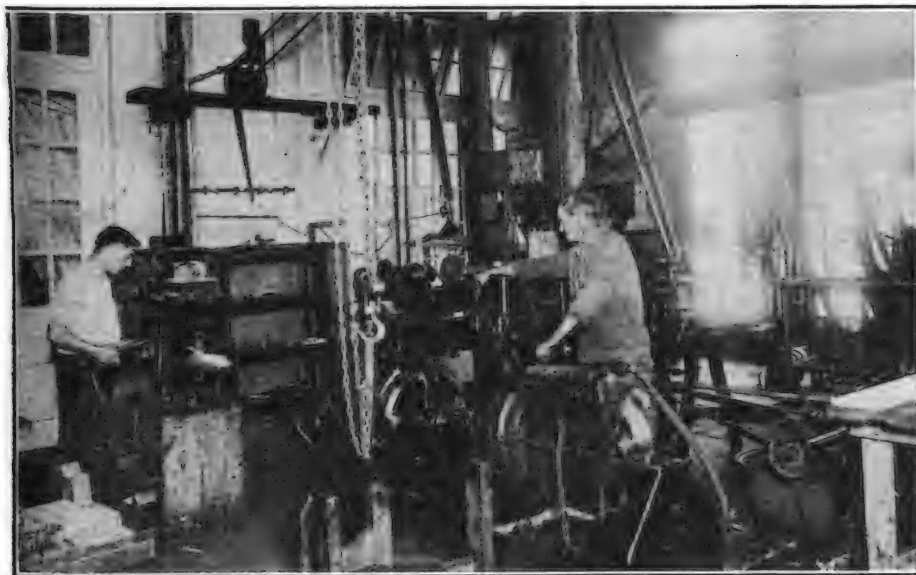


A Section of Repair Department, Showing Mechanics Working on Chassis.

Broad and Myrtle streets, Providence, was designed and built in the Flint service station. The company's sales of

this large quantity of fuel to their service stations and large gasoline users the following motor tank trucks are continually operated: Four Pierce-Arrow tank trucks of 1650, 1460, 728 and 720 gallons capacity, respectively, and one Ford tank truck of 345 gallons capacity.

The railroad siding in front of the service station extends alongside the large gasoline storage tanks that are located in a brick-walled and concrete pit adjoining the service station, affording convenience in running off gasoline from oil tank cars into the storage tanks. The company also receives gasoline from boats at the State pier, located several hundred feet from the gasoline storage station. In the pit are four large tanks, each holding 25,000 gallons, and six tanks, each holding 10,000 gallons, making a total storage capacity of 160,000 gallons; and underneath the floor of the service station are three tanks holding about 22,800 gallons more. The development of the gasoline business by Mr. Flint would make an extremely interesting chapter in the business life of any man, but now that the battle has been won and Flint's gasoline is acknowledged to be in keeping with his standard of quality, he is satisfied to sell that product, and others can do the worrying if they wish.



Machine Shop, Showing Engine Installed in Testing Stand and Connected with Electric Testing Motor.

Wilcox Flint motor and tractor distributing agency. The gasoline business organization and distributing facilities have been developed gradually during the past five years. It was started in a small way only to serve the numerous Flint branches. Its growth was natural and the expansion of the service was rapid, made so through the efficiency of serving not only the retail trade, but numerous motor car agencies and large operators of trucks. Alexander R. Fritz, an expert oil man, is the manager of this department. The company also specializes in the very best grades of lubricating oil.

The gasoline company operates eleven gasoline filling and lubricating oil stations in Providence and vicinity. Their pumps are driven by electric motors, the supply of gasoline being pumped from the large storage tanks into reserve tanks and from these tanks cars are filled by gravity. The large two-cylinder pump shown in the illustration of their latest and handsomest filling station at

gasoline average more than 200,000 gallons a month, or approximately 3,000,000 gallons annually. In order to transport



Paint Shop, Where All Fine Jobs of Painting and Lettering Are Executed.

Sales Forms Used.

The sales department uses a simple set of blank forms in sales transactions. In the sales memorandum of order (Fig. 4) you will note the blank section for properly filling in if the order is a time-payment deal, as Mr. Flint sells cars on the deferred payment plan, and his transactions on this basis have been quite satisfactory. Another form is the "Shop Tag and Delivery Check" (Fig. 5), which is explanatory.

Driving lessons are given to new owners by a corps of specially trained instructors, a reasonable number being given to each purchaser.

A Modern Merchandizer.

Dutee Wilcox Flint sets the pace for his selling organization. He is, first of all, a real salesman. He has deviated from the beaten path of worn-out, old methods of selling. His advertising carries the keynote of his own sales talk. It is real human-interest copy. Even the lowest priced car in the world requires selling ability, for the great majority of Ford cars are sold to those in medium circumstances. To anyone the expenditure of \$500 or more must be given serious consideration; then, too, they must be convinced of the reasonable operating and upkeep expense. The Flint organization is fortified with convincing, honest facts applicable to their line, and Flint's sales talks sell.

The attractive style of these breezy and interesting talks as presented to the public is shown in the advertisement reproduced on this page. It is taken from one of Mr. Flint's many heart-to-heart talks in advertisements inserted in the local newspapers.

MEMORANDUM OF ORDER

Sole No. _____ Del. No. _____	
Branch _____ Date of Sale _____	
Name _____ Address _____	
Type _____ Salesman _____	
Delivery Estimate _____	
EQUIPMENT _____ PRICES _____	
Dem. Rims and Tires _____	
Extra Shoes _____	
Oil Gauge _____	
No. Brackets _____	
Tire Carrier _____	
Speedometer _____	
K. W. Lock _____	
Bumper _____	
Self-starter _____	
IF TIME PAYMENT DEAL _____	
EQUIPMENT TOTAL _____	
Additional Cash on Delivery _____	
Car Gas and Oil Delivered _____	
Insurance _____	
License _____	
Stamp and Tax _____	
Sum Total _____	
Credit by Deposit _____	
Balance Due on Delivery _____	
Balance Due on Delivery _____	

ALL PRICES SUBJECT TO CHANGE BEFORE DELIVERY

Note: Dealer must be accompanied by an insurance policy and loan and the notes must be paid at the bank with interest when due.

This order is subject to all the terms and conditions embodied in the Ford Motor Company's retail buyer's order and agreement.

We are not liable for failure to deliver car due to any cause whatsoever.

Fig. 4—Sales Memorandum of Order.

The operation of his automobile vehicle business does not fully occupy Mr. Flint, for he is the executive and the principal owner of the D. W. F. Engineering Co., a concern recently organized to manufacture metal specialties. The plant is splendidly equipped and



GLORIOUS NEWS

For over a week we've been quick-stepping to where the boy leaves the daily newspaper—hot in pursuit of the latest news from the Front.

On the whole, has it been disappointing news? No, NO, NO! Just the opposite—GLORIOUS NEWS! Those can't-be-licked Britishers, backed by brave French Soldiers and the fighting boys from good old Yankeeland, did wonderful work!

I guess every one of us is filled with sincere admiration for the armies over there—AND FOR THAT NOBLE ENGLISH GENERAL, SIR DOUGLAS HAIG! THREE CHEERS FOR HAIG!

LIBERTY BONDS FOR US

Saturday the drive is on. If we can't go to fight—we can stay to help. If we can't be one of the \$1000 War Savings Stamp Limit Men—or can't buy a \$5000 Liberty Bond—by George, what's the matter with our hitting 'er up for a \$50 bunch of those 4½ per cent. coupons?

If we haven't the ready money—only a part—there are ways provided for us to make up the balance conveniently, without financial hardship. So don't try to flunk with that excuse.

In fact, don't flunk at all! Buy Liberty Bonds. Buy all you can chew! Everybody!—unless you're a self-confessed down-and-outer. And for Heaven's sake don't let anybody admit that.

ONE WAY TO GATHER A STOCK OF LIBERTY BONDS—

BUY A FORD CAR

Buy it because the cost is so enormously LITTLE! Because there's no extravagant waste—no attempt at overwhelming luxuriousness. Instead, FORD is the car of genuine comfort, of remarkable power, of dependability and of 100 per cent. value!

Cut out your first idea—to own a high-priced car this season and no Liberty Bonds. Buy a Ford Car instead. With the cost difference purchase enough Liberty Bonds so you'll have to hire a Safe Deposit Box to store them!

Ford Touring Car	\$450
F. O. B. Detroit	
Ford Runabout	\$435
F. O. B. Detroit	

Yours truly,

DUTEE W. FLINT
OPERATOR OF 20 FORD STORES IN
RHODE ISLAND AND CONNECTICUT

it is now principally producing turnbuckles of the type used for aeroplane construction. Statement is made that the turnbuckles made by this company have extreme strength and are preferred by aircraft builders to other types. So great is the demand for the specialty

Shop Tag and Delivery Check

Sale No. _____	Date _____	Salesman _____
Name _____	Address _____	
Type _____	When Promised _____	
Car No. _____	Checked By _____	
EQUIPMENT		
Dem. Rims & Tires _____		
Extra Shoes _____		
Oil Gauge _____		
No. Brackets _____		
Tire Carrier _____		
Speedometer _____		
K. W. Lock _____		
Self Starter _____		
Bumper _____		
Regular Tools and Equipment _____		
Equipment Checked by _____		
Shortage Noted _____		
Shortage Checked by _____		
Adjusted, Greased, Gas & Oil Checked _____		
By _____		
Received Complete, Purchaser _____		

Fig. 5—Shop Tag and Delivery Check.

that the plant is operated day and night to produce it.

The organization of the company and the establishment of its plant is characteristic of Mr. Flint's business policies and methods—making the most of an opportunity and obtaining results that are the best, both from the manufacturing and the sales viewpoints. The company now has contracts that will necessitate production to capacity for a considerable length of time.

Few men of Mr. Flint's age have been as successful as he. He has demonstrated the possibilities for the young, aggressive business man, and his businesses have been developed upon principles and policies that have received the approbation of those who have made notable successes in industry and commercial pursuits. He is deeply concerned in municipal, state and national affairs and is always one of the first to respond to all appeals to the public for patriotic, charitable or philanthropic purposes.

Mr. Flint has been too busy for the past few years to participate actively in his favorite sport, small yacht sailing, but for a long time he and his brother were of the leaders of the yachtsmen of Narragansett Bay, a coterie of amateur sportsmen who are known the world over for their skill and daring. The Flint pennant has been carried first over the line in innumerable hard-fought races, and has been flown on a series of yachts bearing the name Wanderer, probably the most consistently continued title in the history of American yachting, for it has identified the yachts of the Flint family for nearly half a century.

United War Work Campaign To Raise \$170,500,000 For Welfare Service

BEHIND the American armies that are sweeping so valorously across the battlefields of France, and so close that at times they are in trenches,

licit contributions individually. This has meant a great deal of unnecessary endeavor. At President Wilson's request the Young Men's Christian Association,

the Young Women's Christian Association, the Knights of Columbus, the Jewish Welfare Board, the War Camp Community Service, the American Library Association and the Salvation Army have undertaken a single campaign, from Nov. 11-18, to raise \$170,500,000, which shall be devoted to whatever uses may be determined by the committees that distribute the funds.

Were seven different appeals made, and seven different campaigns conducted, these would be less effective than one great drive that will be participated in by all organizations and for a common cause.

United War Work Campaign.

This united appeal will be known as the United War Work Campaign. It will be conducted by a national committee of 35 men and women, consisting of five representatives from each of the seven organizations. The chairman of the



Knights of Columbus Truck Supply Train Leaving Paris for the Front Line Distribution Bases.

in dugouts, in shell craters and often under fire, are the welfare workers—the representatives of the different civic bodies that in normal times are institutions, organized and supported by individuals.

Today these organizations represent the American people. All soldiers are entitled to the comforts and conveniences and the supplies that each provides from whatever resources may be available. There is the same spirit of unity that has characterized the American soldiery wherever met. It is a striking evidence of the solidarity of the people of the United States.

At President's Request.

Until now each organization has so-



Salvation Army Brigadier Greeted by Yankee Soldiers Resting While En Route in a Motor Truck.



Two Knights of Columbus Secretaries and the Trucks with Which They Follow the American Soldiers from Camp to Camp, at Home or Abroad.

executive committee and the director general is John R. Mott, and the treasurer is Cleveland H. Dodge. This committee was organized within 24 hours after the receipt of the request of President Wilson, and it is now organizing its forces for the cooperative endeavor that will mean so much to the American patriots overseas.

Motor Cars Help Work.

This wonderful welfare work would be impossible were it not for the power vehicles used by the different organizations. There are bases where stores of all kinds are kept, and from which these are distributed constantly. That the reader may comprehend the work that is carried on and the great area that is traversed in this distribution, statement should be made that the seven accredited war service agencies have a combined



Col. Barker of the Salvation Army and One of the Trucks Used to Carry Supplies to the First Line of American Army.

fleet of 1500 automobiles.

Six hundred of these are large trucks and are used to transport the supplies from the points of embarkation to the base warehouses in the intermediate zones, where the goods are sorted and classed for immediate delivery and distribution in the front line trenches.

For distributing 900 smaller machines are used. Each is under the direct charge of a secretary or representative of one of the seven war service organizations, who drives his load of supplies straight into the battle sectors, where it is distributed by the secretary and his assistants among our fighting troops. In this manner hundreds of tons of supplies, such as chocolate, candy, gum, cigarettes, cigars, tobacco and food are daily delivered without any charge whatever among the boys.

Secretaries Work Under Fire.

Unafraid, undaunted, without the slightest hesitancy, these welfare workers enter the lines of actual warfare and carry on their heroic and very necessary work under fire. At times they work 36 hours at a stretch when the fighting is hottest, and when assistance and food are absolutely essential to our tired troops. For a week at a time some of them are on duty from 18 to 20 hours a day without sleep. Occasionally, if not frequently, some of these welfare workers are wounded, some gased and some shell shocked while distributing their supplies, and rendering whatever other service they can for the welfare and comfort of our troops.

Operating in conjunction with the fleet of 1500 cars these seven organizations have 300 automobile camp kitchens. These also enter the battle sectors, and from them our boys are served with hot coffee, tea, chocolate, cocoa, bullion and solid food.

How the Work Is Organized.

In all cities where the War Camp Community Service provides a welcome for the man on furlough there is use for motor trucks to carry provisions to the

clubs and canteens. In practically every camp community there are motor buses provided by the War Camp organization and its friends to show the chief points of interest about the city to uniformed visitors. In the cantonments themselves dozens of trucks ply hither and yon supplying soldiers' needs.

In the camps it may be that the truck is marked with the red triangle of the Y. M. C. A., or the sign of the K. of C., or the Jewish Welfare Board, or mayhap the Salvation Army, but in any case it is

carrying supplies to canteens, which mean cheer in the life of the soldier, sailor or marine. In every camp, too, there are passenger cars bearing the blue triangle of the Y. W. C. A., transporting visitors to and from the Hostess House.

Certainly no unit of the motor army receives a more joyous welcome than that of the American Library Association, whether here or overseas, as it arrives at a camp library, a base hospital or a hut, laden with books and periodicals. Such a truck contains fiction and light matter, but best of all from the standpoint of the men are the technical books, which help them to understand the big job of winning war. In every

phase of getting the books to the fighting man motors play a part. There is gathering the books from homes and places of purchase, transporting them to camps or to ships, where they are placed into transport libraries, and overseas there is the transportation to base hospitals, huts and canteens.

In all the soldier welfare work overseas motor trucks are in continual use, the Y. M. C. A. alone having more than 500 trucks and automobiles in use in France at the present time, and driving these trucks is a full sized man's job, as fording of streams, avoiding shell holes and climbing trench parapets are all every day events of the driver's life.

Drivers Must Be Mechanics.

The hundreds of men serving as drivers for the trucks are necessarily trained mechanics. Once started for the front a truck must not be held up, so the man at the wheel must be willing and able to "get out and get under" if necessary and make a speedy repair. However, the welcoming shout sent up at the arrival of the truck with its chocolate bars, its cigarettes and the makings for hot drinks, is reward enough for even a man who has ploughed through shell fire and impossible looking mud holes to get to his destination.

The seven organizations will challenge every boy and girl in the country to assist in this great work. There will be two divisions, the Victory Boys and the Victory Girls. The object of the Victory Boys will be to align a million boys behind a million fighters. Those enrolling in either division must pledge to earn and give an amount individually determined for welfare work among the soldiers and sailors, and this means that no boy or girl can give money he or she has not earned.



A Squad of Soldiers at a Y. M. C. A. Hut in a Shell Crater, Showing How Closely the Welfare Workers Follow the Flag. [C] Official Canadian Photograph.

How Women at Home Can Serve.

The Red Cross has other needs besides those of serving abroad, for those who remain at home, especially the women, can do a great deal of good by preparing to serve wherever there should be need. There are motor and ambulance corps organized under the Red Cross in thousands of communities, many of them with memberships of women. And some of these corps have instituted educational classes the better to fit their members for service. The accompanying illustration shows a class of women drivers of the Red Cross Motor Corps of Newark, N. J., which is receiving 12 lessons in car operation, adjustment and repair. With a stripped chassis to illustrate the subject the lecturer explains carefully to the class, and if necessary to each individual, the details of design, construction, adjustment and repair that can be practically made. Upon the completion of the series a written examination is held and on the average of each student a certificate of ability is issued. Several classes of this kind are studying automotive driving and maintenance at the sales rooms and service station of the Bonnell Motor Car Co., agent for Dodge cars and trucks.

**PHILIP E. HAWLEY OF BOSTON
VICTIM OF INFLUENZA EPIDEMIC.**

Philip E. Hawley of the Hawley-Cowan Co., Boston, the New England distributors for the Saxon car and the Wilson truck, died in that city on Oct. 2, a victim of the Spanish influenza epidemic. Before coming to Boston Mr. Hawley was located in Detroit for a number of years. He was at one time identified with the Studebaker agency and later with the Krit.

GOVERNMENT NEEDS STENOGRAPHERS AND TYPISTS AT CAPITAL.

The United States Civil Service Commission has again sent out a notice of the great demand for stenographers and typists to work in the government office at Washington.

It is stated that those who take these positions will find satisfactory accommodations at the Capitol as the Room Registration Office of the District Council of Defense, at 1381 New York avenue, Washington, D. C., has on its list more than 4000 rooms, which have been carefully inspected and are available for new appointees. The usual charge for rooming accommodations with board is \$40 a month, which includes two meals a day. In addition to these accommodations the government will soon erect residence halls, including cafeterias, for the use of government employees in Washington.

**CHAMPION IGNITION CO. TO BUILD
THREE-STORY ADDITION TO PLANT.**

The Champion Ignition Co., Flint, Mich., is erecting a three-story addition to its plant, which will cost in the neighborhood of \$30,000.

Many Opportunities For Tradesmen In Various Branches of Air Service

To provide for the needs of the recently expanded program of the air service, a drive has been started by Major Willard Wadsworth, department air service officer in New York, to build up a reservoir from which a constant supply of men can be drawn as occasion demands.

Arrangements have been made with the draft authorities to induct men who successfully pass the rigid requirements of this branch. As the result of a special ruling an opportunity is given to men over the draft age having the necessary qualifications to serve in the air service. Fifty-six is the new age limit fixed by the War Department. This ruling is hailed by Major Wadsworth as an important aid in obtaining a new supply of men.

"Heretofore we have been reluctantly compelled to turn down applicants who were more than 46," said Major Wadsworth. "The majority of those rejected

their trades or at some work to which their trade makes them adaptable.

"The air service should appeal to all red-blooded men soon to be called in the draft who want to see service at the front," Major Wadsworth said. "The men in this branch are up where the 'big doings' are. Men having the qualifications demanded are not giving of their best to their country if they do not come forward and enter the air service. It is very difficult to get men who are skilled in these trades, without whom it would be impossible to keep our planes in the air. There must be no slacking in our air program; production of aircraft has reached a quantitative stage, until at present there are more than 1200 De Havilland planes, 6600 training planes, 6000 Liberty Motors and 12,500 training engines. What we need now is the men to repair, assemble and fly the machines."

The pay of the enlisted men in the air



Women Drivers of the Red Cross Motor Corps of Newark, N. J. They Are Given a Course of 12 Lessons in Car Operation, Adjustment and Repair.

were skilled men and the service has suffered a distinct loss as a result of our inability to enlist them. It is hoped that they will readily for enlistment."

The slump in applicants for the air service is thought to be due to a misunderstanding of the draft regulations, many persons believing that one subject to the draft cannot volunteer for any particular branch. The War Department has ruled that all men between the ages of 18 and 46 inclusive, not in class A1 of the draft of 1917 may apply for induction into the air service. This gives those who are armorers, auto body builders, auto and airplane mechanics, blacksmiths, chauffeurs, cabinet makers, carpenters, cobblers, draftsmen, engine testers and repair men, metal workers, motorcyclists, machinists, motor mechanics, magneto repair men, painters, propeller makers, riggers, photographers, tailors, truck masters, vulcanizers and welders an opportunity to enter the air service, where they may continue at

service, it was pointed out, is higher than in most branches. The minimum pay is \$30 a month, with allowances for food, clothing and lodging, but men showing capability may earn as high as \$121.50 a month. Promotion is rapid, depending entirely on the man.

Applications are also being received again after a lapse of six months for commissions as fliers, bombers, observers and balloonists. With the expansion of the air service the waiting list of more than 6000 has been gradually used up and at present there is urgent need of student fliers. Similarly, as in the case of men having mechanical or technical training, applicants applying may be inducted into the service immediately to await assignment to a ground school.

Application may be filed at the office of the air service officer, room 902, 104 Broad street, New York. Information regarding any branch of the service will be given upon written application or personal visit.

Personal News of the Industry in Brief



E. P. Chalfant, General Manager of Automotive Products Corporation.

E. P. Chalfant has resigned as eastern division manager of the Anderson Electric Car Co. and has been appointed general manager of the Automotive Products Corporation, an export house, which was organized last year by the American Steel Export Co. He is one of the best known men in the motor car industry, having been connected with it for over 15 years and was at one time general manager of the Association of Licensed Automobile Manufacturers. Later he was with the Packard and Thomas companies.

Les W. Place, sales manager of the Allen Motor Co., Fostoria, O., has resigned. He has not announced his plans for the future.

Norval A. Hawkins has entered the United States Army Ordnance Department as an assistant to Major George D. Wilcox, who has charge of the Motor Transport Service for the Detroit district. Mr. Hawkins is sales manager for the Ford Motor Co. and will resume his duties with the company when his services are no longer required by the government.

Frank W. Hodgson is now at Washington connected with the Food Administration. He was formerly manager of the C. S. Henshaw Co., Dodge Brothers dealers, Boston.

F. J. Jarosch has become associated with the Liberty Engineering Co., Lancaster, Pa. He is secretary and manager of the company. This company was recently formed for consulting, designing, research and development work. Associated with him are J. E. Perkinson; vice president; C. W. Lea and treasurer, R. A. Helland. Mr. Jarosch was formerly chief engineer of the Bearings Co. of America.

M. Bleiweiss, who formerly served as assistant to sales manager and factory manager of the Premier Motor Corporation, Indianapolis, Ind., has been ap-

pointed manager of the planning department and stores of the Templar Motors Corporation, Cleveland, O.

Zeno D. Barns has become associated with the general department of the Aluminum Castings Co., Cleveland, O. He was for the past three years connected with the Westinghouse Air Brake Co. as non-ferrous metallurgist.

Fred W. Vormelker is now efficiency engineer of the Russel Motor Axle Co., North Detroit, and will have charge of all work pertaining to the following departments: Time study, routing, factory time, employment and efficiency.

Charles M. Steel has returned overseas to continue his work with the Y. M. C. A. He is located in Paris and is in entire charge of the entertainment division of the Y. M. C. A. work in France. He was formerly vice president of the Carl M. Green Co., Detroit, and has been on leave of absence for the past two months.

George T. Bryant is now sales manager for the Hide, Leather and Belting Co., Indianapolis. He was formerly connected with the Russell M. Seeds Advertising Agency. The Hide, Leather and Belting Co. are the manufacturers of leather belting and parts for cars, trucks and tractors.

Samuel W. Prussian has accepted a position in the quartermaster's department for the duration of the war. He is president and owner of the Guaranty Truck Co., Cambridge, Mass.

Clay C. Howery has become associated with the American Steel Supply Syndicate, Detroit, as general manager. The management has been reorganized and the company equipped with an extensive screw machine and heat treating department. The corporation is working entirely on government orders, manufacturing parts for engines. He was formerly associated with the production



Guy E. Tripp, Appointed Brigadier General in U. S. Army.



Les W. Place, Sales Manager of Allen Motor Co., Resigns.

and purchasing departments of the Continental Motors Corporation, Detroit.

Guy B. Wright has joined the sales force of the Buda Co., Harvey, Ill. Since 1916 he has been western sales manager of the Stewart-Warner Corporation and previous to that time was connected with the Vacuum Oil Co. in various capacities for 14 years, being in charge of the sales of motor vehicle lubricants.

A. C. Dallach is now operating a large manufacturing plant at La Grange, Ill. He was formerly proprietor of the Machinery and Motor Co., Quincy, Ill., and has sold his interest to the E. C. Long Co.

B. F. Baldon, who was formerly manager of the Baldon Motor Service and Repair Co., Quincy, Ill., is now service manager with the Battery Electric Garage.

Glen Cutforth has taken the position as service manager with the Topeka Auto Co. He was formerly service manager with the Cutforth Brothers.

Frank D'Arcy has become associated with the Quincy branch of the Overland Automobile Co. as mechanical engineer. He was formerly manager of the Standard Oil Garage, Quincy, Ill.

C. W. Whitson has been appointed general sales manager of the Panhard Motors Corporation, Grand Haven, Mich. He recently resigned from the Fulton Motor Truck, Farmington, L. I.

Dan Cohen has been elected president and treasurer of the Fulton Motor Truck Co. of Newark, N. J. The company will distribute Fulton trucks in New Jersey.

Fred H. Miller is now connected with the Manhattan branch of the Packard Motor Car Co. For the past six years he was manager of the Brooklyn, N. Y., branch. Charles G. Embleton becomes Brooklyn manager.

T. P. C. Forbes has been made assistant sales manager of the Fulton Motor Truck Co. For 10 months Mr. Forbes has been traveling representative for the Fulton.

E. M. McLein has joined the Oneida Motor Truck Co., Green Bay, Wis., where he will be connected with the office of the director of sales. He was formerly advertising manager of the Stegman Motor Car Co.

Charles E. Becker has entered the service and was formerly advertising manager of Jones Motor Car Co., Wichita, Kan.

Ralph J. Handy, who was formerly distributor of the Tonford truck attachments in Detroit, has become sales manager of the Lauto Truck Co., Youngstown, O.

W. G. Bell, for the last four years assistant sales manager in Canada for the Studebaker, has become Canadian sales manager of the Cleveland Tractor Co.

Frank L. Wurl has been appointed sales engineer of the Remy Electric Co., Detroit, Mich. He has been with the company for several years as electrical engineer, where he was head of the research laboratories.

Guy E. Tripp has been made brigadier-general United States Army and placed in charge of the production of ordnance material. General Tripp is succeeded as head of the Production Division by Colonel C. C. Jamieson.

Harry W. Ford has gone to Washington and is now associated with Colonel Barret Andrews in the reorganized Army Transport Corps under General Drake. He was former president of the Saxon Motor Car Corporation, Detroit, Mich.

George C. McMullen is now western representative of the Timken Roller Bearing Co. His headquarters are at San Gabriel, Cal.

S. A. Campbell, who was formerly sales manager of the Warnola Mfg. Co.,



Guy B. Wright, Formerly with the Stewart-Warner Corporation, Now with the Buda Co.

New York, is now associated with the Bay State Pump Co., Boston.

E. S. Ralph has become advertising manager of the R. & P. Tractor Co., Alma, Mich. For several years he was in the advertising department of the American Seeding Machine Co., Springfield, O.

Auguste Choteau has been commissioned a second lieutenant in France. He was former vice president of the Bittel-Leftwich Tire Co., St. Louis, and financial advisor of five other accessory companies.

Earl Moore is now local sales manager of the Moore Motor Car Co. in St. Louis, Mo.

Edward Kohlman succeeds R. L. Johnson as manager of the parts department of the Hudson-Phillips Motor Car Co., St. Louis, Mo. Mr. Johnson has been called to Camp Pike to begin training for a commission in the army.

Neal J. Downey has been appointed sales manager of all departments of the Kissel-Kar Co., and the Edwards Motor Car Co., Milwaukee, Wis. The company is the distributor of the Kissel and the Dodge. For eight years Mr. Downey was manager of the used car department of the companies.

Emil Grossman has gone into business under the name of E. G. Manufacturing Co. at 50 West 54th street. The company's business consists of locating surplus stocks of automotive equipment and supplying jobbers whose stocks are short. Mr. Grossman was formerly president of the Emil Grossman Manufacturing Co.

C. L. Fox is now in Jacksonville, Fla., and is training in the Motor Transport Corps. He was formerly assistant sales manager of the Saxon Motor Car Co.

Donald F. Whittaker has become assistant to H. A. Conlon, vice president of the Acason Motor Truck Co., Detroit. He has charge of sales and was formerly

advertising manager of the company.

Hamilton Olive has resigned as sales manager of the Federal Motor Truck Co., St. Louis, Mo., to become district sales manager for the Vim Motor Truck Co. of Philadelphia, Pa., in Oklahoma, Texas and Missouri.

C. O. Dixon has been appointed manager of the new branch of the Standard Roller Bearings Co. He has been for several years with the motor accessory department of the Shapleigh Hardware Co., St. Louis, Mo.

William A. Scharon has become associated as advertising manager of the tractor bearings division of the Hyatt Roller Bearing Co., Detroit. He was formerly connected with the advertising department of the Packard Motor Car Co. and the Timken-Detroit Axle Co.

Gorden G. Atwell, Nacogdoches, Tex., has been appointed by the Van Spring Oiler Co. of Chicago, their southern distributor. The Van Spring Oiler Co. is located at 222 N. Wabash avenue, Chicago, and make a complete line of Van Spring Oilers for pleasure cars. They are now working on a complete line of Van oilers for the trucks of America and will show these at the Chicago show.

V. C. Fuller has been made special traveling representative of the Bearings Service Co., Detroit, and attached to the main office in that city. He will visit the company's distributors. Mr. Fuller was formerly with the Dictaphone Co.

Lafayette Markle, for a considerable period vice president and assistant general sales manager of Republic company, has resigned that connection and will in future devote himself actively to the operations of the L. Markle Co. and the Chicago-Republic Truck Co., both of which he largely controls. When Mr. Markle joined the Republic organization he retained his interests in these companies and as they have increased in importance he must concentrate his endeavors upon them.



Lafayette Markle, Former Assistant General Sales Manager, Republic Motor Truck Co.



V. C. Fuller, Traveling Representative of Bearings Service Co.

Automobile Drivers and Mechanics Needed



Entrance to Camp Scott, Chicago, Where Red Cross Volunteer Drivers and Mechanics Are Trained for Service Overseas.

DEVOTED to the relief of humanity suffering from any cause the work of the American Red Cross, which may consistently be termed the greatest charity the world has ever known, has increased almost beyond the comprehension of the average mind. The activities of the Red Cross are associated with the battle field, but this is but a part of what it has undertaken. Wherever there is need the Red Cross is always represented and its charities are bestowed upon all without regard to race, nationality or creed.

The American Red Cross is wonderful as an organization. Wherever warfare, disaster, famine or pestilence has caused injury, hunger or sickness, the Red Cross is regarded as the logical means of affording relief. It is doubly wonderful from the fact that its resources are given voluntarily by those who have confidence in its integrity of purpose and the wisdom of its benevolence. Its principal workers are all volunteers, who contribute their services because of the realization that they are directly benefiting mankind.

The Red Cross represents charity in its broadest sense. No matter what the emergency, its organization has always been found adequate to the needs. Without hesitancy all the people of the United States have supplied the funds and the workers have volunteered in numbers sufficient to afford quick and efficient relief.

When the European war began the American Red Cross joined with other Red Cross bodies and distributed its charities wherever there was need. Because military operations were of magnitude never before undertaken needs were enormously increased. The Red Cross required millions where it has needed thousands in money and thousands of permanent workers where but small

forces, serving temporarily, were necessary.

Wherever war operations developed the Red Cross followed the flags. When the United States declared war and the American soldiers joined with the Allied nations on foreign soil, the needs of the Red Cross increased immeasurably. Appeals for funds and for workers were made and were met with a spirit that was as patriotic, as was evidenced by those who carry the colors—always forward and never

backward to the victory that is certain to reward American unity and valor.

The Red Cross now has thousands of workers overseas. It has an organization perfected that is marvelously efficient. The relief it affords cannot be measured by terms that can be comprehended by the average mind, because values are represented by lives saved, by suffering relieved, by comfort bestowed and by gratitude that at best can only be expressed in words.

The policy of the Red Cross has been to ask the people to contribute money and to appeal to those who wish to participate in the noble and unselfish work that is so universally needed. There are, of course, many thousands who because of conditions and lack of resources would not be able to give their services entirely without compensation, and to those who will serve in differing capac-

ities the Red Cross gives such pay as it consistently can.

The Compensation for Services.

The compensation for activity in Red Cross work is not what is paid in money. It is the knowledge that one is serving one's country and its cause just as patriotically, just as earnestly and just as devotedly as though one was with the flag. And thousands of the Red Cross workers are with the colors, serving on the battle field and doing their part as fearlessly and as nobly as those who man the artillery or tanks or aircraft; as those who in the trenches and on the open field bear the brunt of the assault or the attack; as the men who are combating the seas in destroyers or standing at the guns of the battleships awaiting the appearance of the German fleets in the open.

True it is that they do not bear arms, and they are not combatants in the sense that they win victories, but they are just as much a part of the great American army that is battling for Liberty across the seas as though they wear the khaki and insignia of the world's greatest republic.

The constant flow of American troops overseas, the gradual growth of the Allied armies, and the almost continuous conflict since early last spring has made demands upon the Red Cross that can only be met by volunteers for service for the duration of the war. The American army inspired the Allies with new valor, its example and invincible spirit has turned the tide that is now sweeping across France and Belgium, and will not be stayed until Germany has been forced to submit and the menace to the security of all the nations of the world has been dissipated forever.

Red Cross Wants Volunteers.

The American Red Cross wants men who can drive and who can serve as automobile mechanics for service in France. It wants men who are willing to serve their country and the cause of



Drivers and Mechanics Training for Red Cross Service at Camp Scott Driving a Truck Through a Stretch of "No Man's Land."

By Red Cross Service For Overseas Duty

humanity until there is no longer need. It wants men who will make the sacrifice of their time and endeavors because of the common reward for mankind. And it needs these men more urgently than words can imply when seen in printed form. The Red Cross organization is superb. It is not willing that men shall engage in work abroad unless they are trained and equipped for specific service. The volunteers for Red Cross drivers and mechanics are needed for the transportation department, that division that delivers the supplies from the bases to the field and line hospitals, that conveys the wounded and sick from the front to the rear.

All men who respond to the appeal are sent to the base at Chicago, where the Red Cross Automotive and Mechanical Bureau is located. A training camp and barracks known as Camp Scott has been established at 6046 Cottage Grove avenue, which is commanded by Major H. P. Harding, a well known automotive engineer of Chicago. That the men can be sent overseas as quickly as possible and at the same time fit them so they can do their work intelligently and well, a rigid course of training, continuing about four weeks, is given.

How Volunteers Are Trained.

The volunteers are uniformed and they are trained to discipline that will be beneficial to the service and to themselves. At the barracks there is a complete automotive shop, where cars and trucks are assembled and reassembled. This work is directed by competent instructors, and besides the assembling and study of all mechanical functions the men receive demonstrations of all probable accidents and failures and are taught the quickest methods of determining the cause and making restoration.

Grounds have been laid out on which men are taught to drive trucks and cars through, around or over obstacles. Some of these sections represent conditions that might be expected in No Man's Land. Large pits, for instance, resemble shell holes; piles of brick and debris are spread over the paths or tracks and the men are required to drive at certain speeds with certain loads through these paths before they are given ratings as drivers.

Lectures and Actual Work.

The men are taught by series of lectures by leading engineers of the automotive industry. The subjects are taken up systematically. Men who are managers and the heads of large enterprises give their time to teaching the men what they ought to know of theory. Some of these engineers are authorities. Others are connected with some of the largest specializing concerns, the makers of bearings, carburetors, magnetos, ignition systems, tires, etc., and other authorities lecture on topics that will prepare the men for the work, and make them self-reliant and resourceful. From

time to time Red Cross officials address the men and give them first hand information of the service they are to engage in and what will be expected of each volunteer. Each week every possible damage from breakage or failure of a truck or car is covered by lectures and actual field demonstrations.

The men daily engage for several hours in repair work of all kinds and in some instances building new cars. The Red Cross has made arrangements with about 100 garages and repair shops in Chicago so that the men will have the best kind of intensive training under highly competent instructors. The work is graded and marks are given daily, the methods of grading being the same as is

by the Erikson Co., advertising counsel, New York City, which is devoted exclusively to the illustration of uses made of Tarvia in constructing drives and walks on private estates. There is some description of the manner of application and the results obtaining, but the greater part of the pamphlet is given over to illustrating drives and roadways about residences and private clubs in different sections of the country. The properties are both large and small and the effect of smooth and dustless roads is interestingly presented by a series of admirably chosen subjects. The publication may be obtained from the Barrett Co. through its New York office or its numerous branches.



Red Cross Volunteers at Camp Scott Making a Repair in the Field, a Part of the Work Done During the Training Period.

used in technical schools.

These garages display signs as follows:

All Repair Men and Mechanics
in This Garage Are
RED CROSS MEN
Training for Overseas Duty.
Stand by the Colors.

Nominal charges are made the public for the work that is done by the volunteers, which are turned in to the Red Cross and the fund used to purchase additional equipment. While the men are overseas they are paid \$40 a month and maintenance, and while training they receive half pay and maintenance. On the date of embarkation for Europe the men each receive a paid up insurance policy for \$1000. The service is open to men under 18 years and over 45 years of age, or those rated in classes 5, 4, 3 and 2.

TARVIA USES ON PRIVATE ESTATES.

An extremely interesting booklet has been prepared for the Barrett Co.

NEW TOWN ON LINCOLN HIGHWAY IN NEBRASKA.

A new town has grown up upon the route of the Lincoln Highway between Clarks and Silver Creek, Neb., its sudden growth recalling to mind the rapid developments of a similar character of pioneer days. The new community is known as Havens. It will serve as a commercial center for the rich agricultural country surrounding.

A crew of shovelers kept the snow cleared away from the concrete sections of the Lincoln Highway leading into Fort Wayne last year, and traffic continued without interruption. It is planned to provide the same measure for keeping this highly important thoroughfare open to travel during the coming winter.

A Lincoln Highway conference has just been held at Akron, O., between President A. F. Selberling and Secretary A. F. Bement, covering many important phases of the activities of the National Association.

Reports of Activities In the Motor Industry



New Office Building and Units of the Plant of the Acme Motor Truck Co., Cadillac, Mich., Just Completed and Occupied.

The Acme Motor Truck Co., Cadillac, Mich., which was established several years ago, has developed rapidly. The company has produced machines built from highest grade standard construction units, its sales and service policies have been sound and satisfactory, and the progression has been consistent with good business principles. The company built its own plant and when this and its facilities were inadequate it acquired the shops and equipment of the Cadillac Machine Co., which increases the floor area of the works to about 120,000 square feet, an addition of about 70 per cent. to the manufacturing space. The company is extremely well prepared for production, and it has adequate financial resources, now having total assets of approximately \$900,000, which are sufficient for all requirements.

The second addition made this year to the body building department is practically complete and will shortly be occupied and operating. Since it began the manufacture of bodies the output has increased very rapidly, many buyers having their equipment supplied by the company. The company occupied its new offices early the present month, this department requiring rather more than 9000 square feet of floor space, which is pointed out as an evidence of Acme growth and progress.

The Chicago Pneumatic Tool Co. for the six months ending June 30 reports profits of \$889,009. Shipments for the first six months of the year were valued at \$5,179,318, as compared with \$3,926,703 for the corresponding period of 1917.

The Sun Motor Car plant at Elkhart, Ind., has been sold to W. L. Huffman of Omaha, who will use it as a truck factory.

The Auto Indicator Co., Grand Rapids, Mich., has been reorganized and will continue the manufacture of the four-in-one safety signal. Its new capitalization is \$50,000 and the officers are: W. W. Huelster, president; E. C. Cilley, vice president; Joseph Renihan, secretary and treasurer.

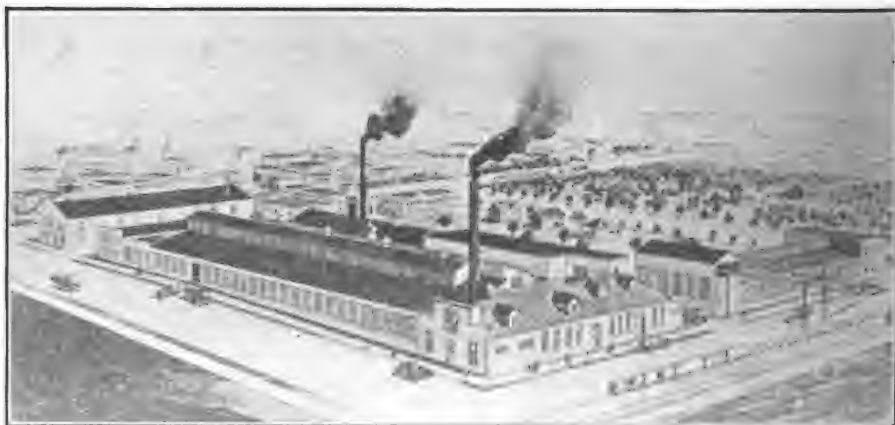
The King Motor Car Co., Detroit, Mich., has announced a new price schedule, which went into effect on Sept. 23. The touring car has been advanced \$220 to \$2370, and the foursome has been ad-

vanced a similar amount to \$2570. The price of the sedan on the new list is \$3200, an increase of \$250.

The Chevrolet Motor Co. has sent out a notice to stockholders of a meeting to be held in Wilmington, Del., Oct. 11, at which they will be called upon to approve the plan calling for the dissolution of the company and the distribution of its assets, which consist of 732,684 shares of the common stock of the General Motors Corporation. This stock will be distributed to Chevrolet stockholders on the basis of 1 1/7 shares of General Motors Corporation common stock for each share of Chevrolet Motor Co. stock. The various operating subsidiaries under the name of the Chevrolet Motor Co. will be retained as going companies, the plan calling for the dissolution of the Chevrolet Delaware corporation only.

John N. Willys, president of the Willys-Overland, Inc., has secured control of the Moline Plow Co. of Moline, Ill., one of the largest manufacturers of tractors and farm implements in the world. In addition to the main plant the company has over 20 branches.

The Streater Motor Car Co., formerly of Streater, Ill., will be disposed of in a foreclosure sale which has been set for Thursday, Oct. 10, at Ottawa, Canada.



Works of the Cadillac Machine Co., Cadillac, Mich., Recently Purchased by and Now Known as No. 2 Plant of the Acme Motor Truck Co.

The H. H. Franklin Manufacturing Co., Syracuse, N. Y., makers of the Franklin air cooled car, have received a contract from the Wright-Martin Aircraft Corporation for parts of Hispano-Suiza engines.

The McGraw Tire and Rubber Co., East Palestine, O., has made a slight advance in certain sizes of casings. Dealers discounts remain unchanged.

The Kales Stamping Co., Detroit, Mich., manufacturers of pressed metal parts, is building a two-story addition to its factory on Lafayette Boulevard. The building is 47x67 feet and contains 6000 square feet of floor space. It will be used for storage and stock purposes.

The Detroit Twist Drill Co., Detroit, Mich., has erected an addition to its plant, 33x70 feet., with 6100 square feet of floor space.

The Chandler Motor Car Co., Cleveland, O., has declared a regular quarterly dividend of \$3 a share, payable Oct. 1 to stockholders of record Sept. 20.

The Standards Parts Co., Cleveland, O., has declared a regular quarterly dividend of 1 1/4 per cent. on the preferred stock, payable Oct. 1.

The Oakland Motor Car Co., Pontiac, Mich., is erecting two additions to its main plant, one on either side of the entrance. The new quarters will be ready early in November and will provide additional office space, room for employees lockers, recreation and an expansion of the hospital ward.

The Goodyear Tire and Rubber Co., Akron, O., has declared the regular quarterly dividend of 1 1/4 per cent. on preferred stock.

Edward S. Smidt and J. H. Knox, 238 Central avenue, Newark, N. J., doing business as the S. & K. Specialty Co., with a factory at Irvington, N. J., have purchased the manufacturing and selling rights of the International lens, an anti-glare device for automobile head lamps.

The U. S. Rubber Co. has planned an issue of \$6,000,000 five-year seven per cent. notes which, it is understood, will be used in refunding the \$9,000,000 issue of General Rubber Co. debentures,

which are due Dec. 1.

The Portage Rubber Co., Barberton, O., has declared a quarterly dividend of 1 1/4 per cent., payable Oct. 1 to stockholders of record Sept. 20.

And Happenings Among the Parts Makers

The Kissel Motor Car Co., Hartford, Wis., has been granted a patent covering its All-Year Cab for trucks and cars. The patent covers the interchangeable features of the cab as well as an interchangeable driver's seat.

The Stewart-Warner Speedometer Co., Chicago, Ill., has liquidated the remainder of its outstanding notes, which leaves no outstanding indebtedness except in current accounts. It is expected that net liquid assets of \$5,000,000 will be revealed by the Oct. 1 balance sheet. The company is now on a 50 per cent. war basis, and additional war work is being taken up.

The Chandler Motor Car Co. has already delivered 100 of the 10-ton caterpillar tractors for the army and at present rate of production will have 1000 completed by January.

The Paige-Detroit Motor Car Co., Detroit, Mich., will be on a 100 per cent. war basis early in January. Only a few passenger cars are now being turned out, the bulk of the production at the plant being munitions.

The Schacht Motor Car Co., Cincinnati, O., has doubled its floor space and manufacturing facilities through the erection of a large addition to its plant. Production on the larger scale will begin about the first of November, when fully 80 per cent. of the output will be government work.

The Liberty Carburetor Co., Detroit, Mich., has been organized to manufacture a special carburetor for the Ford car and which will be known as the Liberty. Jere McCarthy, president of the McCarthy Motor Sales Co., is head of the new company.

The Auto Body Co., Lansing, Mich., has received an order from the government for truck bodies, valued at approxi-



One of the Fleet of Five 3½-Ton Federal Trucks Used in the Operations of the Madera Sugar Pine Mills in California.

The Kuenz Radiator Co., Toledo, O., has been incorporated with a capital stock of \$100,000 to manufacture radiators for De Havilland airplanes. The incorporators are: President, J. H. Armstrong of Cutting, Armstrong & Smith, Detroit, makers of motor car parts; vice president, J. A. Kuenz; secretary, S. E. Cobin; assistant secretary and general manager, E. C. Shields; treasurer, Charles D. Cutting.

C. R. Baker is now general manager of the Cadillac Sales Co. of Knoxville, Tenn. He has had wide experience in the automobile field, having been factory branch manager of the Akron, O., branch of the Ford Motor Co. and assistant manager of the branch at Cleveland.

Grover C. Phillips has been appointed an instructor in the quartermaster's department at Camp Joseph Johnson, Florida. He was formerly manager of the Phillips Garage of Chillicothe, Mo.

been succeeded by L. H. Phelps. Mr. Phelps will assume full charge of Mr. Christman's duties in the Gill Piston Ring Co., the Bearings Co. of Pennsylvania and the Chalmers Sales Corp. Mr. Christman is going into the government service.

The Marathon Tire and Rubber Co., Cuyahoga Falls, O., presented its employees with an Honor Flag as every person on the pay roll subscribed to the Fourth Liberty Loan.

J. H. Faw, Inc., 37 Warren St., New York City, have added an assortment of link fuses to their already extensive line of fuses and are also distributing a chart which shows what particular fuse is needed on any car.

The Kissel Motor Car Co., Hartford, Wis., has announced the following list of new factory dealers: Marvel Motor Co., Kline, Col.; Hunsperger & Son, Corbally, Ore.; Oswald Garage, Tuscaloosa, Ala.; Wade Motor Co., Calera, Ala.; Wade Motor Co., Centerville, Ala.; Krael Bros., Rogers, Neb.

The Delion Tire and Rubber Co., Trenton, N. J., has increased its capital from \$700,000 to \$1,000,000.

The Chalmers Motor Corporation stockholders have ratified the plan for reducing the capital stock of the company from \$7,060,000 to \$6,400,000 by the cancellation of 132,000 shares of common stock, which was held in the treasury. The capital stock now consists of 400,000 shares of common without par value and 44,000 shares of the preferred with a par value of \$100.

The Maxwell Motor Co., Inc., for the year ending July 31, 1918, made a net income of approximately \$2,400,000, which amount does not include the excess profits tax or corporation tax in excess of six per cent.

The Oakland Motor Co., Pontiac, Mich., advanced the price of all Oakland models on Oct. 1 \$100, the touring car and roadster being listed at \$1285 in the new schedule and the sedan and coupe at \$1860.



A Semi-Trailer Adapted for Heavy Haulage with a Five-Ton Truck, the Equipment as Shown Being Utilized for Carrying Stone.

mately \$500,000.

The Olds Motor Works, Lansing, Mich., will be on a 100 per cent. war work basis by the first of the year. Deliveries on the order for 2000 kitchen trailers will be made this month and production will also be begun on an order for Liberty engines.

Peter H. Davies, in the sales department of the Grand Rapids, Mich., Overland Co. for a number of years, has been made head of a special department in charge of truck sales development.

P. C. Christman has severed his connection with the Gill Piston Ring Co. as treasurer and general manager and has

Government Bureau of Standards

Tests Anti-Freezing Solutions

The question of anti-freezing solutions for automobile radiators was brought very forcibly to the attention of users of motor vehicles last winter, and many requests for information regarding their use were received at the Bureau of Standards. An investigation was undertaken by the bureau to establish the value of these compounds and sufficient data have recently been obtained to justify a preliminary statement. These tests were made on the metals (such as brass or copper and solder) that are used in radiator construction and in the same combinations that are used in such construction. This is necessary in order to obtain the electrolytic action, which is largely responsible for radiator corrosion. Tests made without

even to the melting of the solder in the radiator. It has a marked solvent action on rubber parts. These facts would seem to clearly indicate that this material should not be used.

The alcohol-water type is the most common and is not generally sold under any trade name but recently there have appeared on the market a number of anti-freezing compounds of the calcium chloride type. These compounds are sold under a variety of names and starting claims are made for their effectiveness and lack of injurious effects.

The effectiveness of all properly prepared compounds, that is, their ability to prevent freezing, needs no discussion. The injurious effects, however, cannot be safely disregarded.

TABLE GIVING THE FREEZING POINTS OF SOME ALCOHOL AND GLYCERINE ANTI-FREEZING SOLUTIONS.

Temperature are given both in degrees Centigrade and degrees Fahrenheit. The figures in parenthesis are specific gravities at 60 degrees Fahrenheit. Percentage (by volume) in water and freezing points.

	10 pct.		20 pct.		30 pct.		40 pct.		50 pct.	
	Cen.	Far.	Cen.	Far.	Cen.	Far.	Cen.	Far.	Cen.	Far.
Denatured alcohol.....	-3	+27	-7	+19	-12	+10	-19	-2	-28	-18
	(0.988)		(0.978)		(0.968)		(0.957)		(0.943)	
Wood alcohol.....	-5	+23	-12	+10	-19	-2	-29	-20	-40	-40
	(0.987)		(0.975)		(0.963)		(0.952)		(0.937)	
Glycerine	-2	+29	-6	+21	-11	+12	-18	0	-26	-15
(Sp. Gr. 1.2537)										
Denatured alcohol and glycerine*	-4	+25	-8	+18	-13	+9	-22	-8	-32	-26
Wood alcohol and glycerine*	-4	+25	-9	+16	-15	+5	-24	-11	-35	-31

*Glycerine and alcohol are mixed in equal proportions. Ten per cent. glycerine and denatured alcohol means 10 parts of mixed glycerine and alcohol, or five parts glycerine and five parts alcohol should be added to 90 parts of water.

regard to electrolysis are practically worthless. This work will be continued, tests equivalent to service conditions will be made and a more comprehensive report given at a later date, but in time for use during the coming winter.

The ideal anti-freezing compound is one that will prevent freezing of the radiator liquid without injuring either engine or radiator, that will not lose its nonfreezing properties after continued use and that does not materially change the boiling point of water when dissolved in it.

Two Types of Compounds.

There are two general types of these compounds—one a solution in water of alcohol or glycerine, or a mixture of the latter two, the other a solution in water of calcium chloride or the dry salt itself, which contains sometimes small amounts of other substances, such as salt, sal ammoniac, sugar or syrup. Kerosene and similar oils, without admixture, are some times used.

Kerosene has a lower freezing point and higher boiling point than water, but the inflammability of its vapor makes it dangerous to use, and its high and uncertain boiling point might lead to the serious overheating of the engine, or

The alcohol solutions do not exert a greater corrosive action than water alone. This can be predicted from theoretical considerations and is well established in practice. However, wood alcohol some times contains free acid, such as acetic acid, which is objectionable, and for this reason wood alcohol should not be used unless it is known to be free from acids.

The calcium chloride compounds exert a greater corrosive action than water on the engine jacket, on the solder in the radiator and on aluminum, which is some times used in manifolds, pumps and headers. The effect on engine jackets may be neglected since these are generally sufficiently heavy to permit considerable corrosion without being weakened. The effect on soldered joints may be serious, since tests made at the Bureau of Standards have shown the complete removal of solder from copper and brass when immersed in a hot 20 per cent. calcium chloride solution for four days. A number of such tests were made and there was always a more rapid corrosion or eating away of solder in these anti-freezing compounds than in water.

Calcium Chloride Solutions.

Calcium chloride solutions corrode aluminum very rapidly. The effect is variable, depending on the kind of aluminum used; blisters appear on ordinary rolled sheet aluminum and as these break the metal separates into scales or plates of corroded aluminum, which open up like the leaves of a book; cast aluminum, especially the copper alloys, show very decided pitting and etching. These tests show conclusively that the corrosive action will be very serious and it is difficult to reconcile these results with the current statement that the effect of calcium chloride solutions on aluminum is not very serious.

Another troublesome effect of calcium chloride solutions is experienced if small leaks occur in the radiator, the water jackets, or connections, and the solution comes in contact with the spark plugs and ignition wires. In some cases the drops of the solution may be carried back on the engine in a more or less atomized state, assisted by the fan when running. The salt deposited when the water evaporates is very difficult to remove and when it cools absorbs water and becomes a good electrical conductor, short-circuiting the spark plugs and some times making it impossible to start the engine. The difficulty may disappear when the engine is heated up.

There are also certain conditions in the manufacture of calcium chloride which may result in a compound that will deposit large crystals in the radiator as the solution cools; this may prevent effective circulation.

Regardless of these objections, reports have been received to the effect that calcium chloride solutions have been used a number of years in the same radiator without producing apparent corrosion. Nevertheless, such solutions cannot be recommended as safe, and they should not be used if there is any aluminum in the cooling system.

The chief advantage of calcium chloride compounds is that they are not volatile. The solutions can be kept practically uniform by adding water from time to time. Unfortunately this is not true with the alcohol solutions, because the alcohol continually boils out and it must be replaced frequently in order to maintain the proper proportion of alcohol. Glycerine is frequently substituted for part of the alcohol to reduce evaporation, but when glycerine is used the rubber connections may be affected somewhat seriously, depending on the quality of the rubber. The most practical method to maintain the proper quantity of alcohol in the solution is to determine the specific gravity of the liquid by means of an hydrometer and by reference to the appended table add the necessary quantity of alcohol to obtain the desired gravity. Care should be taken to have the solution thoroughly mixed and as the specific gravities given in the tables are obtained at 60 degrees Fahrenheit, the specific gravity should be measured when the temperature of the solution is between 55 degrees Fahrenheit and 65 degrees Fahrenheit.

The solution may then be kept at the proper strength from day to day by adding alcohol until the hydrometer reads the same as when first noted.

In order to illustrate how a non-freezing solution is prepared by using the table, assume that the lowest temperature anticipated is 19 degrees above zero Fahrenheit and that denatured alcohol is to be used.

By reference to the table in the line marked "denatured alcohol" + 19 degrees Fahrenheit is found in the 20 per cent. column and the specific gravity of that solution is 0.978.

If the radiator holds 3.5 gallons 20 per cent. of this must be alcohol and the remaining 80 per cent. water. Twenty per cent of 3.5 gallons ($3.5 \times .20 = 0.7$) is 0.7 gallon, or a little more than 5.5 pints. Hence a little more than 5.5 pints of alcohol will be required. This should be added to enough water to make 3.5 gallons, i. e. the water used will be 3.5 gallons—0.7 gallon or 2.8 gallon; a little more than 11 quarts.

If the temperature of this solution is brought to 60 degrees Fahrenheit and an accurate hydrometer is floated in it the hydrometer should read 0.978. If the reading is higher than 0.978 more alcohol should be added with constant stirring until the 0.978 mark is reached. (An accurate hydrometer should read 1.000 when placed in water at 60 degrees Fahrenheit and 0.834 in 180 degrees proof alcohol at the same temperature. The denatured alcohol usually sold by dealers is 180 degrees proof, which is the minimum allowed by law.)

A solution so prepared will not begin to freeze until its temperature is approximately + 19 degrees Fahrenheit.

A careful consideration of the question of anti-freezing solutions for radiators leads to the conclusion that (1) calcium chloride compounds should be used with caution, if at all, on account of their corrosive action; (2) kerosene or similar oils should not be used on account of their inflammability, high boiling point and effect on rubber; (3) mixtures of glycerine and alcohol can be used, but the price of glycerine, and the need for it in the manufacture of munitions at the present time should preclude its use; (4) solutions made from either wood alcohol or denatured alcohol seem at the present time to be the most desirable anti-freezing solutions to use. If the wood alcohol is free from acid there is little choice between the two alcohols. Wood alcohol costs more than denatured alcohol and is more volatile, but its lower freezing point allows a less amount to be used, which may counteract the above disadvantage.

Numerous tables have been published giving the freezing points of certain water solutions containing alcohol, glycerine or a mixture of the two, but there is much disagreement in the figures given.

There is appended a table of freezing points obtained from actual measurements made at the Bureau of Standards, on solutions of commercial materials, which may be considered sufficiently accurate for practical purposes, since they agree fairly well with the most reliable scientific data.

The freezing point is taken to be that temperature in the cooling process at which crystals begin to form. The temperature at which the entire mass becomes solid may be several degrees lower than the freezing point for dilute solutions, and 10 or 15 degrees lower for the more concentrated solutions.

As an example, a 30 per cent. solution of denatured alcohol begins to freeze, that is small crystals of ice form, at seven degrees Fahrenheit, but the solution does not freeze solid until a temperature of — five degrees Fahrenheit or lower is reached. Hence a temperature considerably lower than that given in the table for any given percentage of alcohol would not injure the engine or radiator. However, it seems desirable to keep the solution at such a concentration that ice crystals will not form at the lowest temperature to be encountered, since such crystals may interfere with circulation.

One of the most serviceable of this type of tops is the "A W" all-weather convertible top. In designing it the makers kept in view the various points that a motorist would consider in judging a top and have produced a product which not only meets the essential requirements of a convertible top as a protector for the passengers against the elements, but one that adds to the appearance of the car when up, and in which every detail of workmanship indicates that the maker's idea for a superior product has been carried out. It is, however, simple in construction, a feature which greatly enhances its value as there are no complicated parts or mechanisms to cause trouble or to rattle and squeak.

It consists of a patented "one-man" top, shaped to conform to the lines of the car body and of removable windows made of glass, enclosed in light steel frames, which are carried in the car at all times. The top frame is made of



The "A-W" All-Weather Convertible Top Installed on a Ford Touring Car Giving Complete Protection to the Occupants.

A CONVERTIBLE TOP WITH GLASS DOOR AND WINDOW PANELS.

The idea that automobiles were toys and should be used only in clement weather and on good roads, passed years ago with the marketing of the many devices that insure the operator and passengers of comforts on cold and stormy days that make driving in the open more satisfactory than riding in trains. Of these many devices for providing against the unpleasant features of winter weather none have contributed so much to the satisfying results as the convertible top, which can be put in position in a few minutes or folded back again in as short a time, giving the owner all the protection required, while at the same time adding little weight to the load carried to the car or incurring the expense of a permanent enclosed top or that of keeping an enclosed car for winter and a touring type for spring, summer and fall use.

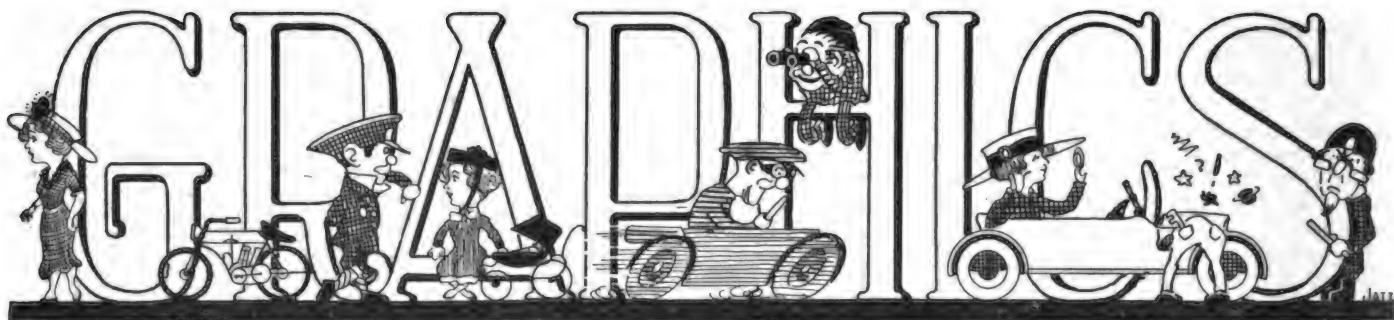
steel covered with flexible weather proof material and is lighter and more resilient than a permanent wooden top. The door panels open with the door, an arrangement that eliminates the use of side curtains.

It has very graceful lines, which follow those of the car, and there is no overhang or other disfiguring projections. There are different sizes for all makes of cars.

The "A W" all-weather convertible top is manufactured by the Adams-Williams Manufacturing Corporation, 351 West 52nd St., New York City.

CHESTER I. CAMPBELL HONORED BY BOSTON AUTOMOBILE DEALERS.

Chester I. Campbell, secretary of the Boston Automobile Dealers' Association, was recently tendered a dinner by the members of that organization as a testimonial to his work as manager of the government's war expositions. President J. H. MacAlman presided.



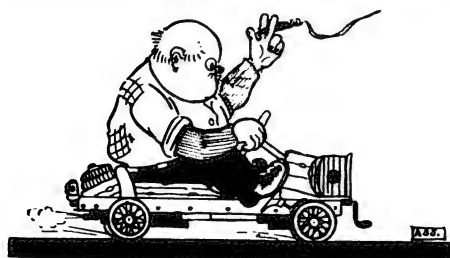
"German machine guns well entrenched made an attack by infantry impossible. Soon up the road came 10 little Fords, each mounting one or two machine guns. They passed right through the Germans spouting streams of bullets on either side. The Germans retreated and the operation was completely successful, only two cars failing to come back. The outfit was at once christened 'Ford's Cavalry.' This news dispatch from overseas discloses the fact apparently that the small tanks which are being made in this country are making a name that will live long in the annals of achievement with their larger brothers which stamped the Germans also, and will add more laurels to the crown of wreaths that must be conceded to the motor car industry for its performance in the complete obliteration of the Hun.

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In these days of high gasoline prices and high prices for everything, including automobiles, why not make your own car. It's not such a tough job, Bill Powell of Chicago, Ill., says, and he has a "self-made" car to back his statement that any man with two hands and a head can turn out a "bus" that makes up in efficiency what it lacks in size.

Bill wrote to the Remy Electric Co. of Detroit and Anderson, Ind., about his baby motor car a few days ago, saying that he has used a motorcycle engine and a Remy generator for ignition and lighting.

The power plant is a two-cylinder, 11 horsepower engine, and the wire wheels



are fitted with airplane tires, which Bill says "make it pretty soft." As the car is extremely light, Powell avers that "the gasoline consumption is unusually low."

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During the races at Readville, Mass., several weeks ago, W. J. McDonald, a real estate dealer of Boston, created quite a furore when he drove down in the stretch in front of the grandstand with a full blooded black Shetland pony in the tonneau of his car. The pony, which was donated by Mr. McDonald to the Red Cross fund, was auctioned off and brought \$1750. The pony exhibited unusual spirit and activity during his ride and the sale and did not seem to feel the insulting glances of the race horses, who seemed to feel that it was adding insult to injury to parade one of their kind about in an automobile after seeing thousands of spectators arrive in



the very same machines that were usurping their place in civilization.

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Many of the younger element who were wont to speed to their hearts content in this country and let father pay the fines are now on the other side driving cars in the various departments of the war service. While many occasions probably arise over there calling for a speed that is in keeping with their ideas of locomotion and they are given an opportunity to go into high and open the throttle, but the majority have also learned of traffic rules that cannot be violated, as if they are, the consequences are quite often death. On the roads in the immediate theater of active operations one quite often runs across a sign reading: "Caution—This Road Observed by the Enemy. All Traffic Must Go Slow to Avoid Raising Dust, Which Draws Enemy Shell Fire."

It is needless to state that these instructions are scrupulously observed and receive more respect than the conventional signs found along our roadways to the effect that the speed limit is so many miles per hour.

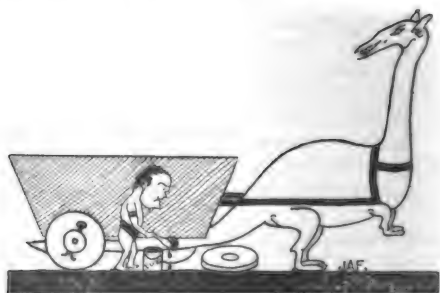


Although the necessity of lubrication to eliminate friction probably originated with the cave men when they hitched the first dinosaurs to their crude carts and has been recognized down through all the ages as a means of preventing wear on moving parts in contact, many motorists fail to give their cars proper attention in this respect.

Some motorists wonder why, with the smooth, finely ground bearings with which automobiles are equipped nowadays, it is necessary to use a lubricant. A strong magnifying glass held against the surface of a bearing, especially a new one, will reveal the answer—myriads of minute depressions and protrusions cover the metal surface of the bearing. It is obvious that something is required to fill up this roughness to present a perfectly smooth contact surface. Hence a lubricant is used.

Ordinary greases or oils are not sufficient, as they soon squeeze out when the bearing becomes warm. Garage men and automobile mechanics recommend a lubricant containing a flake graphite, as it is the only substance that will adequately fill the uneven surface and stick there despite the rubbing and the heat. In fact the harder it is rubbed the smoother it becomes.

If a car were to be run without a lubricant in the bearings it would screech fiendishly. Plain grease or oil stops the screech, but they both squeeze out under pressure, friction sets in and the bearing eventually wears out. The Joseph Dixon Crucible Co. worked on this principle when they brought out their graphite automobile lubricants. The Dixon com-



pany has developed the science of lubricating and now puts out a graphite lubricant for every purpose and place on the car.

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The speed maniacs have tried the patience of the public, caused exasperation among the authorities in charge of enforcing the law and brought opprobrium upon their heads from the pens of the editors, but no such drastic recommendation for eliminating this class of nuisance has come to light, as has been suggested by a writer in the Woburn

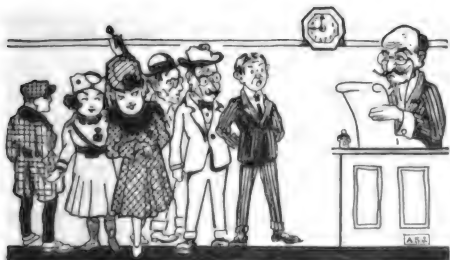


Times (Mass.). Whether or not this gentleman was ever struck by one of the speeders is not known, but if his experience with them were to be judged from the vindictiveness of his idea as to how they should be treated, he not only must have been hit, but rolled over a number of times, as he suggests that "speeders should be jailed without bail. It is just such men as these that should be dragged into court at the noose end of a rope attached to the police car and then given a chance to break rock for a few years."

Of course such harsh treatment for the speeder is really out of the question, but sometimes it seems that it would be justified punishment, as these maniacs know it is against public policy, the law and their own interest, yet they persist in the evil practise. But then it must be remembered that speed maniacs are necessarily irresponsible people, and as such, a pace of 50 to 80 miles an hour, if necessary to gratify their mania, would be pursued even in the face of a possible penalty of a little thing like \$100 fine or a few days in jail.

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While it is a generally recognized rule that the motorist should sound his horn or signal on approaching an intersection of highways, yet it appears that many do not take this precaution unless they see other vehicles approaching. This rule is a law also in many states and while seldom enforced should nevertheless be respected, as neglect to do so



will only bring the rule into prominence with the result that it will be as vigorously prosecuted as the laws against speeding. Our attention has been called

to an incident which serves to show how general the negligence has been in this respect. At a summer watering place last month the police chief was instructed to apprehend and bring before the court all motorists who failed to sound their horns at intersecting streets. As a result of the campaign 51 auto drivers, nearly all summer tourists, were before the court in one day. These drivers hailed from 50 different towns and a dozen different states, showing that this practise of taking a chance is not peculiar to any particular locality.

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Many slackers who have been driving their machines about for pleasure on gasolineless Sundays were unmolested and spun onward unconscious of the breach of faith they were committing, but others were not so fortunate. Many motorists who in violating the law landed in court found that the judges were disposed to treat their offenses with less leniency than under ordinary circumstances, while others found themselves the object of jeering, abusive mobs. One man who found himself in the center of a thriving Massachusetts city, with his gasoline tank empty, and could proceed no further, suddenly found himself in the center of a gathering that vent its feelings upon him in such a manner that if he lives to be many moons, he could never commit all the crimes he was charged with. His wrath, which was aroused at this abuse, was soon dis-



pelled, however, as a matter of policy, as his retaliation to the epithets only served to draw a bigger crowd and encourage those who were already haranguing him. It was suggested to him that his only course out of the predicament was to return to his garage, a suggestion with which he complied after some one had agreed to procure the gasoline necessary to make the journey.

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The first motor truck mail and parcel post delivery between western Pennsylvania cities will be started within the next few days between Pittsburgh and McConnellsburg. The route will be over the Lincoln Highway and will cover a total distance of 126 miles. Two three-ton motor trucks will be used.

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While one would generally suppose that since the advent of the automobile there are few places that boasted of even a few inhabitants that had not been visited by a motor car, yet it seems that within a two days ride of one of our largest cities there are communities that are as startled at the sight of a car as the farmer was upon first viewing the

giraffe, he vouchsafing that they couldn't fool him, because there weren't no such animal. Such was the experience, however, of Mr. and Mrs. Belden of Canton, O., when they went on a trip in their new Franklin car to inspect some mining property in the Ozark mountains of Missouri and Arkansas. They state that it seemed as though they were lost every other mile on the route and that when arriving in several small mountain towns the people were startled upon seeing their car and gathered about it as though it were a curiosity. The people stated that it was the only big car they had ever seen.

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The Lincoln Highway is the route of first interest in the exposition of modern traffic as indicated by recent events upon the Pennsylvania section. The passage of huge trains of heavily laden motor trucks, hurrying supplies to east-



ern ports for shipment to the troops in France, is a matter of daily record at practically each stop upon the highway across the state.

Motor ambulance units are also noted upon the road bound for the same destination. Vast amounts of commercial freight are transported over this route by motor vehicles operated by private enterprise. The traffic is constantly growing in volume and variety of character.

Not only upon the Lincoln Highway proper but in the air above are signs of the future movements of transportation. Airplanes are frequently noted following the general line of the highway in extended cross-country flights.

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Miss Helen L. Roberts, St. Louis, Mo., is probably the first traveling sales representative in the accessory jobbing trade and has already proven her ability in this line. She took the place made vacant on the sales force of a large dealer in St. Louis when a salesman joined the colors for service overseas, and immediately displayed exceptional sales ability.



Power Farming Implement Guides

By Hand Or Operates Automatically

By Frank C. Perkins.

CONSTRUCTED to principles that are alike revolutionary of farm operating and agricultural implement design and use, the Synmotor, a power machine developed at Laurel Spring, N. J., is seemingly the pioneer of what has considerable promise of becoming automatic farm cultivation. The machine has been built with the very practical idea of use with and without

which is mounted the engine and the driving mechanism, and at right angle to this frame is an adjustable out-rigger, at the end of which is mounted a third wheel. The wheels are all metal and have wide rims, those in the main frame having cleats or spuds in the rims that afford traction. When hand operated the Synmotor can be turned in very small radius and because of the out-rigger construction it can "straddle"

steering lever on the cultivator—whether it is near or at the far side of the field. The wire fully controls the machine, even if it is started several hundred feet away from the post.

Operates Around the Center Post.

The Synmotor is started and moves in a circle around the post, gradually winding the wire around the drum. In other words, with each full circle around the post the wire is wound once around this drum, and this movement guides the machine the width of one swath nearer the post. Being perfectly tempered the wire cannot stretch and an electro-coated surface protects it from rust. The total weight of the wire is less than two pounds. Over 600 pounds pull would be needed to break it. It winds upon the drum absolutely the same each full circle of the Synmotor. Hence it establishes the location of the machine in any part of the field unfailingly. The wire winds on the face of drum without kinking. When the implement has run as near the post as is practically possible to operate it, the drum is unlocked, the machine moved out of the field, the operator steering it by the hand wheel, the wire unwinding as it moves from the drum.

The four-foot swath may cover several



The Synmotor, an Automatic Power Implement That Is Designed to Operate in Circles, Controlled by a Wire Attached to a Center Post.

operators. The first produced have been found extremely serviceable and useful. While what has been turned out thus far has been in one sense experimental, the results have been sufficiently satisfactory to justify the belief that they can be, in different sizes and capacity, do work very thoroughly, with mechanical precision when operated automatically, and when operated by an attendant they will be equal to other types of power implements.

The Synmotor may be steered by hand for plowing and cultivating straight rows, and with an automatic steering device it will do either work, day or night, without an operator. The claim is made that besides being an exceptionally good implement for hand steering, for plowing and cultivating field crops planted in straight rows, it can be used for other work for which power implements are not practical. For instance, it can be used to break crust and cultivate between drills of vegetable seed or grain after seeding and before the plants have grown above the surface of the ground and are visible. Statement is made that many crops germinate poorly because of a hard crust and lack of moisture and are frequently lost.

Synmotor a Three-Wheel Implement.

The Synmotor in general appearance resembles a large motorcycle, having a frame with a wheel at either end, in



The Synmotor and the Control Post Set Up in a Field, the Wire Connecting Them Being Accentuated to Show the General Manner of Operation.

rows of plants.

When operated automatically it is driven with the out-rigger wheel inside nearest to an operating post that can be located wherever desired. This post, which is shown in an accompanying illustration, is guyed with ropes or cable so it cannot sway. At the top of this post is a drum four feet in circumference, just the width of the swath covered by the machine. From this drum a slender steel wire runs out through a guide pulley on a revolving arm to the

rows. If four rows, consider that if singly cultivated each row would have to be gone over separately, requiring four men, or one man four times to do the same work. Claim is made that the Synmotor does its work much more thoroughly than any hand machine, that it is absolutely accurate and follows its course with no perceptible deviation; that it does not unearth small plants and can be worked much closer to the rows; that further, one can plant rows as close as the plants can be practically grown

and then cultivate them as perfectly as if the rows were three feet apart.

Works Without Lighting.

The inventor of the Synmotor maintains that cultivation with it can preserve moisture and kill weeds from seeding time onward; that it can be operated at night without an operator during rush work, or when the ground is just right for plowing. One of the illustrations shows the accurate automatic steering of the Synmotor. A $7\frac{1}{4}$ -acre patch of cow peas and sorghum was seeded in drills by this machine and the growing plants cultivated, with only occasional inspection by the attendant during num-

Bessemer engine burns kerosene fuel. It is started on gasoline and when hot is switched to kerosene. This is important because of the permanent increase in the price of gasoline.

Larger Machines for Plantations.

In later designs some of the improvements to be added are hardened roller ball pinions and drive chains and a compact six-horsepower engine. This will give more room under the tractor for attachments and a lower tractor for orchard discing. An 1800-pound Synmotor has been developed to cover a seven-foot swath, for grain growers and for southern plantation work. It is designed to be worked on 10-acre areas, the operations being such that alfalfa or other permanent crops can be grown in the space between

square foot of land must pay a profit.

The device that controls the automatic operation of the Synmotor is very interesting mechanically. This consists of a piston and a heavy helical spring operating in an oil filled cylinder, which is coupled to the rear end of the steering lever, and this maintains an even tension on the wire that is attached to the forward end of the lever and wound on the drum in the center of the circle that is worked. The piston cannot be obstructed and its action is positive.

The Synmotor is claimed to do its work for very small cost. For average cultivation the consumption of fuel is about a half gallon an acre and with reasonable care the expense of upkeep and maintenance will be relatively low. When driven by hand plowing can be done to a depth of $6\frac{1}{2}$ inches with a single Syracuse No. 51 plow, and that it will do good work in sod or stubble, or in heavy loam land, after rain has soft-



Corn Planted in Contracting Circular Rows, Cultivated with a Synmotor—Note the Accuracy of the Worked Ground Between the Continuous Hills.



Center Control Post Showing the Stationary Drum Partly Wound with Wire and the Swinging Arm and Guide Pulley.

erous nine-hour runs, some of which were completed after nightfall.

Automatic Work Is Accurate.

The accuracy of automatic steering is remarkable. It has been certified to by many persons who have watched the machine in operation at Lawnside, Camden County, N. J. During many runs the space between the cutting steels and the drills of plants did not vary a half inch. Thus the implement proves its right to its name—Synmotor. Plants grown in closely spaced drills, such as onions and radishes, are not too difficult for cultivation, even in large acreage. It covers fields of growing plants with the speed of a two-horse cultivator and with the accuracy of a garden wheel hoe. It has driven through open furrows, chuck holes and sand filling, proving that the tractor and the steering wire will endure regular farm work.

With disc cultivator steels, disc scuffles and seeder points the Synmotor can be run all day and not gather trash. With spring shanks the steels cut clean over uneven ground and clay spots. The

cultivated areas. Both the light and heavy machines have rear hitches for attaching standard makes of implements, such as potato planters, plant setting machines, seeders and orchard discs.

It is claimed that this implement is especially suited for operation by men not able to do hard all day work, and that it will be extremely useful on southern plantations where the intense heat lessens the work of man and beast.

Circular Cultivation Is New.

The Synmotor method of automatic cultivation in circular rows is absolutely a new idea with market gardeners and vegetable growers. To this machine may be attached any tools required for cultivating, hoeing and hilling. The circular method of planting is new and is claimed to be of special value on intensively operated farms, where every

ened it, and where the ascending grades are not more than eight feet in 100. The plow is attached to the gang bar and the equipment becomes a riding plow with an automatic lift. A disc coupler or marker is attached to the left end of the gang bar and marks a line by which to steer for the next furrow.

With this equipment short turns can be made at head lands, the same as with horses, for the plow can be lifted after the first quarter turn and dropped before the second quarter turn is made, so that head lands can be worked to within six feet of a fence or wall. The outrigger is adjustable to six feet, and the gang bar may be extended at the left side for straddle row cultivation.

New Hall-Scott Six Cylinder Aviation Engine Develops Over 200 Horsepower

Final Test Also Given To Twelve Cylinder Model

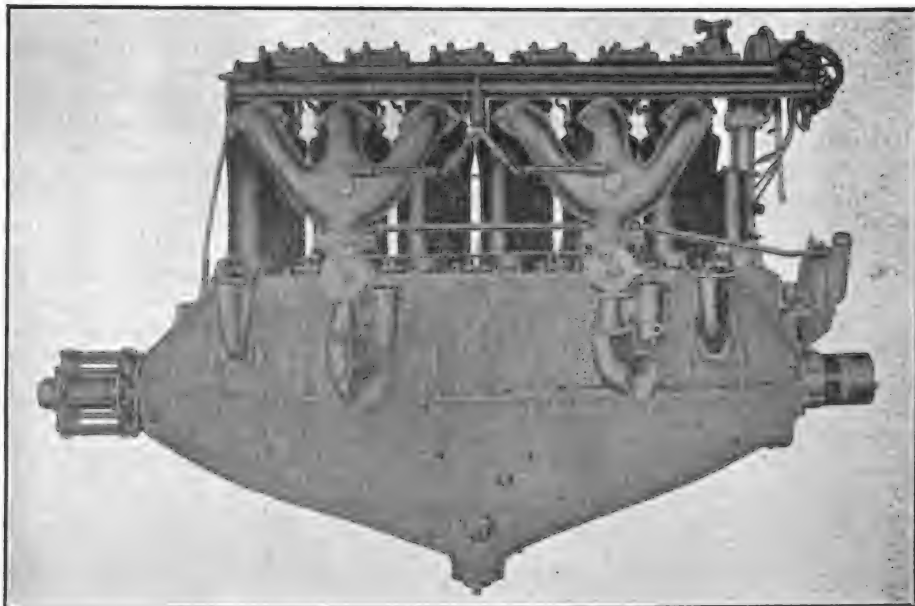
Continued progress in the design and construction of American airplane engines is indicated by the recent block tests of the new six-cylinder, 200 horsepower "L6" type of Hall-Scott engine, conducted by the U. S. government inspectors late this summer.

Announcements of this new airplane engine manufactured by this pioneer firm of airplane engine builders were made early this year. The tests were conducted for the government by George R. Ross, as inspector, and the results of the test indicated that this engine is the lightest weight, high powered engine of more than 200 horsepower rating before the aeronautical world today according to the claims of the makers.

In the six-hour, non-stop, test run at the Hall-Scott factory June 22, the average brake horsepower developed was 212.6 at 1666 revolutions per minute. The engine on the testing stand weighed 502 pounds, which is the equivalent of 2.36 pounds per brake horsepower. The tests were witnessed and approved by U. S. Inspector Ross, acting for the Navy Department, which department was the purchaser of this engine.

Some of the interesting points of comparison pointing to the fact that this engine is a great improvement over the best previous Hall-Scott six-cylinder type are to be noted. Certain fundamental features in the design consisting of refinements of the reciprocating parts, proper understanding of thermal and volumetric efficiencies, lubrication questions and more effective compression pressures has permitted a great increase in revolutions per minute. Greater flexibility also is noticeable, tending to a lowering of the torque and smoother running. Refinement of design has permitted the retaining of all oil in the engine, increasing the economy to such an extent on oil consumption that the amount used per brake horsepower hour is only 0.01 pounds, while in the best previous engine the oil consumption averaged .35 pounds per brake horsepower hours.

The elimination by careful analysis of all surplus metal on all the constituent elements entering in the construction of the engine has reduced the total weight of this engine to 502 pounds, which, contrasted with the A-5a type of engine, which weighed 595 pounds with lower horsepower development, makes the comparison of weight per brake horsepower very noticeable. The A-5a type weighed 3.75 pounds per brake horsepower. Much of this reduction in weight



Hall-Scott Airplane Engine, Model L-6, Intake Side: This Aviation Engine Has Six of the New Interchangeable Liberty Engine Type Pressed Steel Cylinders of 5x7 Inch Bore and Stroke. At a Recent Government Test It Developed 212.6 Horsepower at 1666 Revolutions Per Minute at West Berkeley, Cal., Plant of the Hall-Scott Motor Car Co.

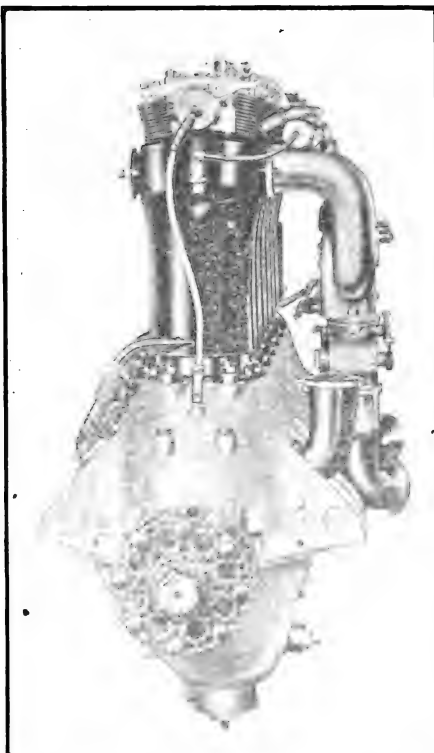
was of course made possible through the substitution of steel cylinders (which are similar to the Liberty engine type, as perfected for the government's great

airplane engine), for the cast iron cylinders previously used.

Due to the increased strength of the steel cylinders it is possible to have higher compression pressure and higher thermal temperatures, which is conducive to greater over all efficiency. Considering the greater volumetric efficiency of this engine the fuel consumption compares very favorably with that of the previous types. Measurements made show consumption of .55 pounds per horsepower hour, which is no greater than that in the older type engines.

Incorporating many of the attractive features of the well designed six-cylinder types of Hall-Scott engines, together with the addition of a number of special features exclusive with its own type, the new A-8 Hall-Scott 12-cylinder airplane engine, just being given its final testing at the West Berkeley, Cal., plant of the Hall-Scott Motor Car Co., marks a decided advance in the design, construction and production possibilities of American airplane engines.

The A-8 type Hall-Scott engine is the lightest weight, high powered engine yet developed in America, with a horsepower rating in excess of 450 and a weight of less than 900 pounds. In fact the first block tests at the Hall-Scott plant, late in July, had to be stopped after the engine was placed on the stand, gradually warmed up and run, because it was evident that the power developed was too great for the testing stand. A special one is being built, and a dynamometer of 600 horsepower rating has been sent for, on which the final test will be



The Propeller End Showing Hub That Is a Development Based on 10 Years Experience in the Design and Building of Aviation Engines.

completed. The engine is fitted with a four-blade propeller.

Its 12 cylinders are 5x7-inch bore and stroke, and are of the pressed steel jacketed type, similar to those which are used in the construction of the Liberty engine. Standardized gears are used throughout, and with the cylinders are made interchangeable with four, six and eight-cylinder engines of the A-5, A-7 and L-6a types of Hall-Scott motors.

As a matter of historical interest, this A-8, 12-cylinder Hall-Scott engine was completed and ready for its preliminary running tests May 1, 1917, and had been placed on the testing block when Col. E. J. Hall, now of the aviation service, United States Army, its designer, was called to Washington to assist the government aircraft production board in the designing of an American airplane engine that would meet the requirements of war time service in dependability of functioning, reduced weight and greater power than any then on the market. Every one who has followed the government's aircraft program knows of the result of Col. Hall's work in Washington and the recognition officially accorded Hall-Scott principles in the authorized war department statement concerning the Liberty engine.

JAMES L. WHITE OF COLE MOTOR CAR CO. VICTIM OF INFLUENZA.

James L. White, assistant general manager of the Cole Motor Car Co., died at his home in Toledo, O., on Oct. 10 of Spanish influenza, which he contracted in Washington while on a visit there regarding some war work that the Cole company was to undertake for the government.

He had been associated with the Cole organization for many years, coming to the company from the Northway Motor and Manufacturing Co. of Detroit. He acted as purchasing agency for the company for some time and about a year ago was appointed assistant general manager and had charge of all production activities at the Toledo plant.

H. L. HALL MANAGES CHICAGO BRANCH OF SWINEHART CO.

H. L. Hall has been appointed manager of the Chicago branch of the Swinehart Tire and Rubber Co., 1328 Michigan avenue, which handles the central western territory.

For the past eight years Mr. Hall has had charge of the western territory for the Troy Carriage Sunshade Co. of Troy, O., manufacturers of windshields and other automobile specialties.

ALBERT W. RUSSEL APPOINTED TO THE WAR CREDITS BOARD.

Albert W. Russel, formerly president of the Russel Motor Axle Co and treasurer of the Russel Wheel and Foundry Co. of Detroit, has been appointed a member of the War Credits Board by the acting secretary of war, Benedict Crowell. He fills the vacancy created by the resignation of F. P. Neal.

Over Half Million Cars Now In Use In European Countries

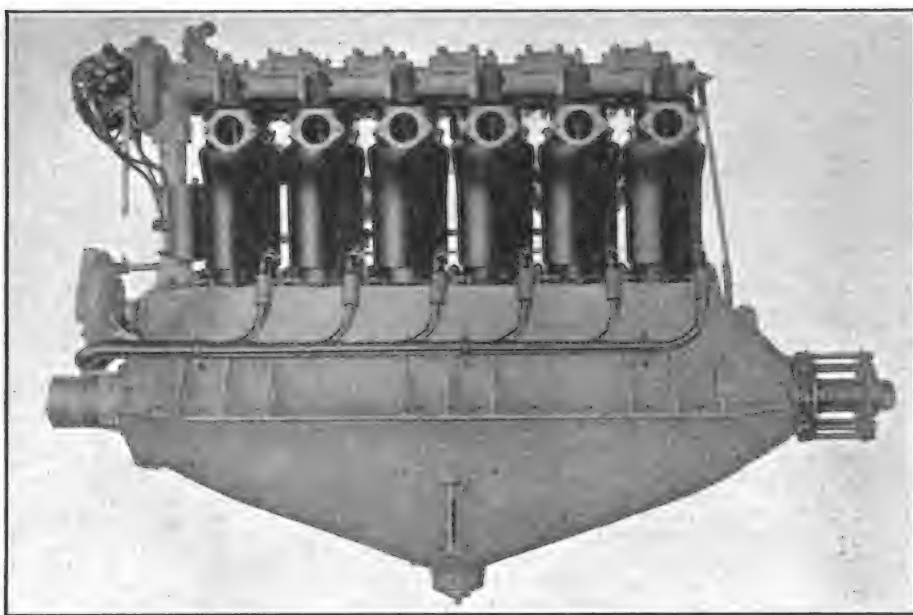
What are probably the first accurate figures compiled since the war started in 1914, showing the number of automobiles in Europe, have been issued by the Fiat Press Bureau of Italy. These statistics place the total number of motor cars in Europe as 522,112, although they are not compiled from very recent reports, as owing to the war conditions it has been impossible to get accurate returns from several countries later than 1916, and the number included for Germany, 95,000, is the number in use in that country in 1914.

The returns are for passenger cars only in most instances and do not comprise lorries and motorcycles. England's

Spain	10,253	1918	1,989
Holland	10,000	1917	658
Sweden	9,000	1916	620
Denmark	8,500	1917	343
Switzerland	6,157	1914	611
Portugal	3,211	1917	1,692
Norway	3,067	1918	730
Bulgaria	3,050	1916	1,419
Roumania	2,500	1913	2,899
Finland	2,000	1917	1,800

JENKINS VULCAN SPRING HAS ATTRACTIVE SERVICE PROPOSITION.

The Jenkins Vulcan Spring Co., Richmond, Ind., makers and distributors of Vulcan springs, have built up an exceed-



Hall-Scott Airplane Engine, Model L-6, Exhaust Side: Its Weight Is 502 Pounds with Cast Steel Cylinders, or 2.45 Pounds Per Horsepower. Equipment with the New Interchangeable Pressed Steel Cylinders of the Liberty Type Reduces This Weight Considerably.

returns are lower for 1917 than they were for 1914. Yet England has added considerably to her number of commercial motors by reason of the war.

The French returns are based on actual taxes paid and not including taxicabs, lorries or motorcycles. Before the war the actual number of privately owned motor vehicles in France was about 115,000. Since then it is estimated that France has imported or built 80,000 war motors.

The statistics for the principal countries, with the year they represent and the proportion of cars to inhabitants are:

Country	Cars	Population	Year	Per Car
Great Britain...	171,607	1917	268	
France	98,400	1916	402	
Germany	95,000	1914	684	
Italy	35,500	1918	1,002	
Russia	27,900	1916	531	
Austria-Hungary.	19,360	1916	2,671	
Belgium	14,700	1916	515	

ingly satisfactory service for dealers and car owners with their product and in addition to the strong advertising support they furnish dealers in a number of ways with practical helps in displaying and selling their springs. The Vulcan display rack, which is sent free with an assortment of springs, enables the dealer to display the stock in an attractive manner and also offers the customer a convenient means of examining and selecting the spring he wants.

ELKHART AUTOMOBILE CO.

A petition has been filed asking that the Crow-Elkhart Automobile Co. of Indiana and Arizona be declared bankrupt and a receiver be appointed. The petition was filed in the Federal Court at Indianapolis by the Charles Monger Co. and the Isbell Lumber and Coal Co. and Ora Neff of Lockport. Judge Harmon of the Elkhart Superior Court has appointed M. U. Demarest receiver.



Mechanical Helps and Information Submitted by Readers and Suggested by Our Mechanical Department in Answer to Queries. Time and Money Saving Methods and Devices Which Can Be Used by the Amateur with Practical Results.

RAISING THE CAR. (Figure 524.)

Repair men often place jacks under the frame of the car when it is necessary to remove the rear assembly, a practise which requires blocking of the front wheels. Care must also be taken that the body is not touched, as very slight pressure would cause the car to fall off the jacks. A simpler method of raising and holding the rear of the car steady is illustrated. This suggestion can only be adopted, however, when there is a chain fall attached to the ceiling of the room. The top of the car is lowered and the tonneau floor board removed. Next cut from a plank four inches wide and about 2½ inches deep a length that will tightly wedge into the channel steel frame of the chassis. The board should be rounded at the edges as shown at A, so that it can be driven with a hammer into the frame. A sling can then be placed around the board and then placed in the hook of the chain fall. The advantage of this method is that it is impossible for the car to be pushed over.

EXHAUST HEATER. (Figure 523.)

The illustration shows a practical exhaust heater which can be made in a short time by anyone having a pipe threading tool. The exhaust pipe is cut at a point between the exhaust and the muffler and a pipe T is screwed to it. Two pipes are screwed to the T, one going up through the floor of the car to an elbow, "X," into which is screwed a short length of piping, which forms the heater. The other connects with a second T. From the second elbow on the heater a pipe is run to the second T, which is connected with the muffler by another pipe. It is desirable to have the Ts in line so as to form a straight exhaust line from manifold to muffler.

The size of the heater pipe itself may be varied by using reducing elbows, as at "X" and "Y." If it is found that the device furnishes too much heat, it may be covered with asbestos and painted to match the finish of the car.

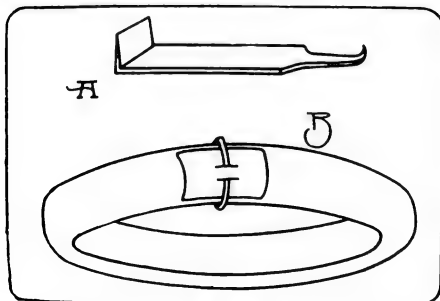


Fig. 527.

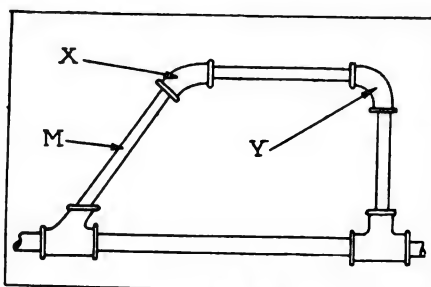


Fig. 523—Exhaust Heater.

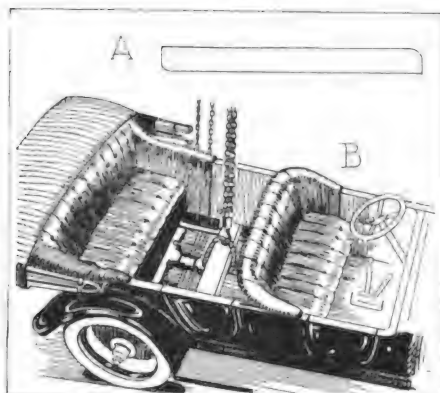


Fig. 524—A Practical Means of Raising the Car When a Chain Fall Is Available.

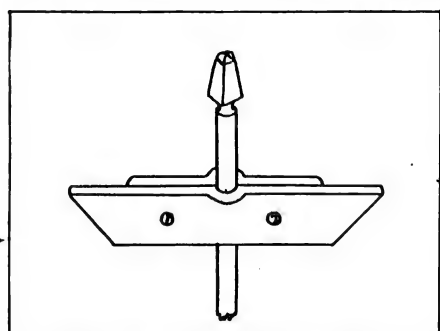


Fig. 525—Valve Reseater.

REPLACING SMALL SCREWS. (Figure 526.)

An old steel pen has its use in repair work, especially when replacing small screws in speedometers, magnetos, electric horns, etc. These screws are generally too small to be held in the fingers, in which case slip a screw into the slit or hole of the pen, which should be held in a penholder. In this way it is easy to start the screw.

VALVE RESEATER. (Figure 525.)

By constant regrinding the valve seats often become so worn and grooved that the valves seat so deeply as to permit only a small opening and a consequent loss of power. When this is the condition the valves should be replaced by larger ones and the valve seats recut to a larger diameter. The illustration shows an easily constructed valve reseating device. The cutter blade is made from a flat piece of tool steel, fitted with a strap for holding it to an old twist drill, and with its edges cut to an angle of 45 degrees. The shank of the drill should be left long enough so as to extend down through the valve guides, and large enough to fit and form a center for the cutting tool.

HOME-MADE SCREW DRIVER. (Figure 527A.)

For the removal of some of the larger sizes of machine screws the ordinary screw driver is often found inadequate, it being impossible to apply sufficient grip to its handle to turn the screw. While the turning effort may be increased by applying a small wrench, or pliers, to the blade, an offset screw driver is a much handier tool, combining function of lever with that of screw driver.

Such a tool is also useful in dealing with screw heads in such close proximity to other parts as not to admit the length of the ordinary screw driver. One can easily be made from an old file, heating the end to a dull red and bending it at right angles to the length. The edge is then ground off to a thickness suitable for size of screw for which it is to be used.

PROTECTING TIRES. (Figure 527B.)

Many owners fasten their spare tires to the side or back of the car with common skate straps. This practise is objectionable, for when they are held in this manner for any length of time the strap wears the rubber from the tire. A simple and practical remedy for this is illustrated in the sketch. Two slots should be cut in a piece of leather, measuring about four by six inches, and strap threaded through the slots as shown.

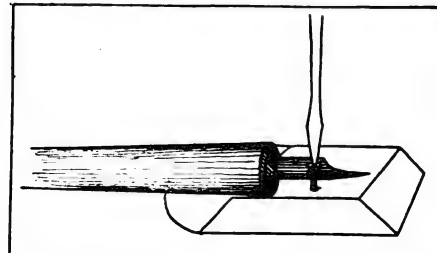


Fig. 526.

LOCATING COTTER PIN HOLES.

(Figure 528.)

In removing a nut held by the cotter pin one is invariably so intent in getting the nut off that the location of cotter pin hole is seldom noticed. In fact, it is doubtful if this is ever thought of by the average layman, until such a time as it is desired to put it back when the nut is again in place. A simple way to make sure of the location of the hole is to mark the end of the shaft by means of two notches cut in the edge with a cold chisel in the same plane as the hole or by a straight line cut on the end with a cold chisel. See sketch. When putting on the nut it can be screwed up tightly until the castellated openings in it line up with the marks on the edge of the bolt, at which time the cotter pin can be easily inserted.

TESTING CONNECTING RODS.

(Figure 530.)

In installing new bearings in the connecting rods it is important to know that these are correctly placed in relation to the rod itself and the side of the piston. A jig for ascertaining this, similar to one used by one of the large motor makers, consists of a substantial stand, A, mounted on a bench or table, mounting a vertical shaft, B. To the upper end of this shaft is securely fixed a smooth and accurate face plate, A. Near the lower end is a short projecting shaft, D, of the exact diameter of the bearing of the crankshaft. Also the axis is exactly at right angles to the surface of the face plate. The distance between the parts C and D corresponds with that between the piston and the connecting rod bearing.

The piston and rod assembly is used complete. The bearing is clamped on the shaft, D, as it would be onto the crankshaft, and so that when rocked back and forth the piston just touches all or partly on the face plate, C. If the contact is perfect, the alignment of the bearings is considered to be correct. If the piston bears on the face plate on only one edge the alignment should be remedied. In some cases this, while not to be generally recommended, may be done by placing the rod in a vise and bending slightly through a long leverage until the alignment by trial becomes satisfactory. Of course the proper way, theoretically, is to have the bearings scraped in.

PUTTING FLANGE ON TUBING.

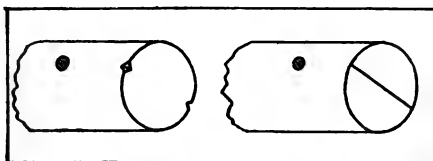
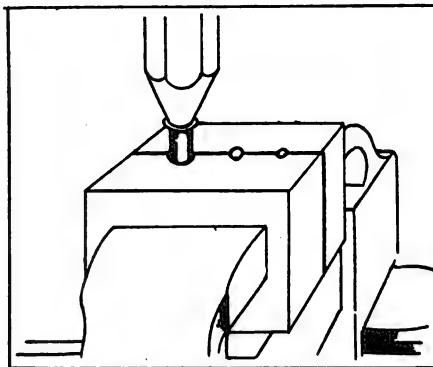
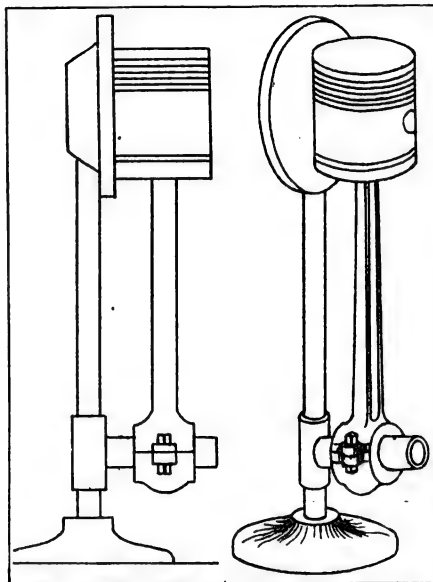
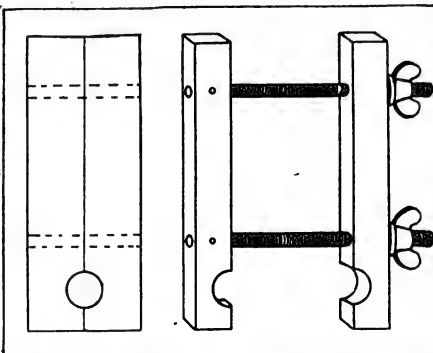
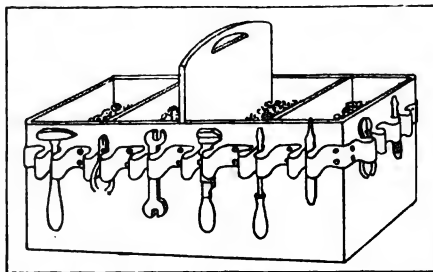
(Figure 529.)

A simple way to make a flange or rolled edge on copper tubing when installing a new gasoline line is as follows: Mark a center line on a block of hard wood and along the line bore three or four holes of sizes corresponding to the outside diameters of the most common sizes of tubing. Then saw the block longitudinally in two sections through the exact center of the holes. Place the tube in its proper hole in the two sections and clamp in a vise, allowing the tube to extend one-quarter inch above the surface of the block. The flange or roll can be made by driving in a round nose punch of suitable size placed in the top opening, as shown.

CHAIN DRAWER.

(Figure 531.)

There are few tasks more exasperating than trying to join the two ends of a tight chain. At times one needs several hands to hold each end, line up the holes and insert the pin at the same time. It is especially awkward when chains are in places not conveniently accessible. A handy little device which may be easily made to do this work is herewith illustrated. From soft steel stock $\frac{1}{2}$ by $1\frac{1}{2}$ inches cut a piece about six inches long. Draw a center line lengthwise along the wide faces. About one-half inch from one end of this center line drill a half inch hole. About $1\frac{1}{4}$ inches up from this bore a one-quarter inch hole from narrow

**Fig. 528—Locating Cotter Pin Holes.****Fig. 529—Putting Flange on Tubing.****Fig. 530—Aligning Connecting Rods.****Fig. 531—Device for Drawing Chains.****Fig. 532—Handy Garage Tool Box.**

face to narrow face and about $3\frac{1}{4}$ inches further up bore another one-quarter inch hole in a similar manner, being careful to drill true so the holes will be in the center of the narrow faces. Now with a hack saw cut along the center line you have marked. Cut a couple of pieces of one-quarter inch round stock about four inches long. Thread each up to within an inch of one end with some thread for which you can procure wing nuts. Set the unthreaded ends flush in one of the jaws and secure with small pins. The threaded ends put through holes of the other jaws and put washer and wing nut on each. You now have a handy little clamp useful for many purposes. To use this to tighten a chain spread the jaws apart and placing one in each end of the chain, allowing the roller of the latter to seat in the recess of the jaw to prevent slipping. By tightening first the top nut and then the lower one a powerful leverage will be obtained, which will hold the chain in position while same is being securely fastened together. Simply unloosening the wing nuts will allow the clamp to be removed.

HANDY TOOL BOX.

(Figure 532.)

A handy box for keeping together, ready for instant use anywhere, the most often used small tools and an assortment of nuts, bolts, washers and cotter pins may be made from a common box of convenient size, preferably with sides about $\frac{3}{4}$ inch thick. The most satisfactory one will be found to be of oblong shape. This should be divided into four parts by three partitions, as shown in the illustration, the center partition having an opening cut in it for a handle.

Along the sides of this box and placed near the outside upper edges screw a long strip of strap metal having sufficient spring in it to hold its shape if temporarily distorted. The kind used on the revolving rubber stamp stands, but a little heavier, will do. Pick out the few small tools you most often use for quick jobs and bend the strip of metal in shape so that each tool may have a place of its own around the box and may be easily removed by a quick jerk when in a hurry.

CHARGING BATTERIES.

(Figure 537.)

To charge a storage battery it is necessary that a direct current be available. If it is not a device called a rectifier must be used which will transform alternating current into direct current. Having secured the correct current, so to speak, it is next necessary to consider the voltage or pressure of the same. As a common voltage for lighting circuits is 110 volts, the diagram given herewith is on this basis. Before going much further it is necessary to know the polarity of the circuit, or rather, which is the negative (—) and which is the positive (+) wire. A simple way to do this is to mix in a vessel some salt and water in the proportion of about a tablespoonful of salt to a tumbler of water. Taking the wires by the insulation, so as not to get a shock, dip the bare ends into this mixture in the vessel, keeping them at least an inch apart. Immediately fine bubbles of a gas will be seen to be given off one wire. This is the negative (—) wire. Connect up through a resistance (R) made up of carbon filament lamps (use seven 110 volt, 32 candlepower, 100-watt carbon lamps, or 28 110 volt, 25-watt carbon filament lamps), as shown, making sure that the positive wire of the circuit is connected to the positive terminal of the battery. This will probably be found stamped "+," or maybe it will be painted red. Install in the circuit a double pole single throw switch to start and stop the current flow. The battery charge is complete when, with all the cells gassing evenly and freely at the charging finish rate (as given on the battery plate, the gravity of the solution in all the cells shows no further increase during one hour. This is

determined of course by means of a hydrometer, an instrument which should always be handy where there are batteries to be tested or worked upon. The reading for charged cells should be from 1275 to 1300. By voltmeter the battery should show from six to eight volts when fully charged. Any battery maker will gladly furnish a booklet giving complete diagrams for wiring and instructions for procedure in charging batteries. The diagram herewith is given for what it may be worth to you or other interested readers in lieu of more detailed information.

EFFECT OF WIND RESISTANCE.

(Figure 536.)

Wind resistance while a negligible factor at moderate speeds is very important at high speeds. In fact it has been said that in racing at 100 miles an hour more than 75 per cent. of the power used is to overcome the wind resistance, so you can see that this is really something to be seriously considered. The shape of the car bodies you mention is for a very good purpose and a smooth and properly designed line is a big factor in a car's success. As for the tail piece you speak of this is very important, too, as it must be designed so as to minimize the suction or back pull when the car is traveling fast. On this page is a graphical illustration of the effect of wind pressure or resistance at high speeds, shown in the shape of a curve. Upon examining it will be seen that as the speed of a car is increased the wind resistance is greater in increasing proportion. To find the wind pressure at any speed look up the vertical line representing the speed under consideration and where it intersects the curve draw a horizontal line which by the scale given at the left of the diagram will show the pressure. Regarding the windshields of pleasure cars, the slanting is probably more for the effect of appearance and to deflect the wind from the passengers than it is to decrease wind resistance. By the curve shown you will see that within the speed range of the average pleasure car the wind resistance is not very great.

SANITARY WASH STANDS.

(Figure 534.)

A wash stand equipped with an ordinary well to hold the waste which passes through a garage drain is generally troublesome and unsanitary, it becoming choked with mud and matter so that the waste will no longer flow out. If a bend, as shown in illustration, is installed the annoyance will be overcome. This will draw off the water from below the surface, preventing the solid matter in sus-

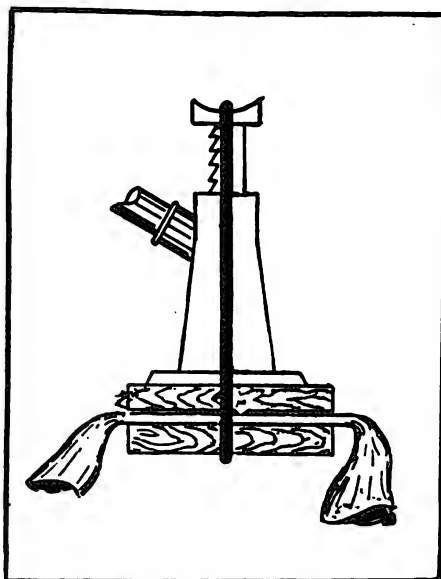


Fig. 533—Emergency Tube Press.

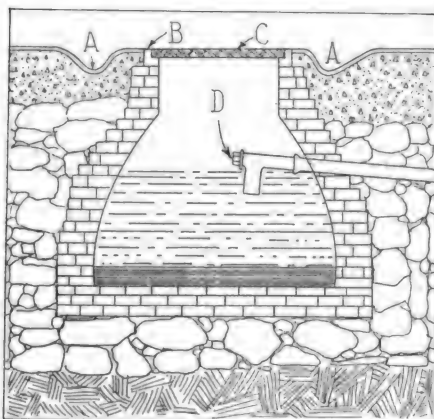


Fig. 534—Sanitary Wash Stands.

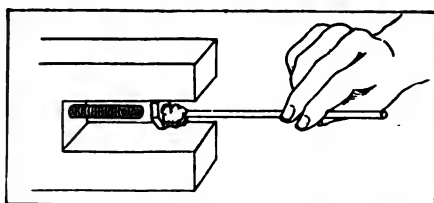


Fig. 535—Chewing Gum in Repair Work.

pension from getting into the drain, but allowing it to settle at the bottom of the well, from which it can be removed easily. The bend, or elbow, is provided with a cap, D, which allows access to the drain for flushing purposes. As a further convenience a slight depression or valley, A, may be made in the floor just adjacent to the grated cover, C, which sets in the rim cover, B, so that the waste will settle there instead of passing into the well. The sediment can be removed periodically.

CHEWING GUM IN REPAIR WORK.

(Figure 535.)

It quite often happens that the amateur repair man is unable to replace a nut on a bolt located in some part of the machine where the designer evidently did not take into consideration the fact that space is required for the fingers or other tools in working on the same. This often results in the loss of one's temper and a waste of much time. Quite often in a place of this kind the nut can be easily put on by sticking it on the end of a stick with a wad of chewing gum and holding it against the bolt, turning it until the thread catches.

EMERGENCY TUBE PRESS.

(Figure 533.)

Any motorist can improvise a tube press for roadside repairs if the following suggestions are heeded: After applying the patch to the tube place it between two blocks, measuring about 4x6x2 inches and mount an ordinary automobile jack upon the topmost block. Bind a strong piece of wire or cord around the blocks and over the head of the jack, as illustrated by the black line in sketch. By raising the jack the wire will be drawn tight and produce the pressure necessary to make the patch adhere firmly to the tube.

LOCATING A LOOSE BEARING.

(Figure 540A.)

It is quite easy to feel for play in connecting rod bearings, when the crank case is open, by moving the rods up and down by hand. To feel for slack in main bearings is more difficult, because of the weight of the parts which have to be moved. In the case of the rear bearing, for instance, it is necessary to move the flywheel up and down, which is beyond the average man's strength. It may easily be done, however, by placing a jack under the wheel. It should be used with some discretion, simply applying enough lifting effort to take up any play in the bearing. This can be felt by placing the fingers of the left hand on the main journal, where it projects from rear bearing.

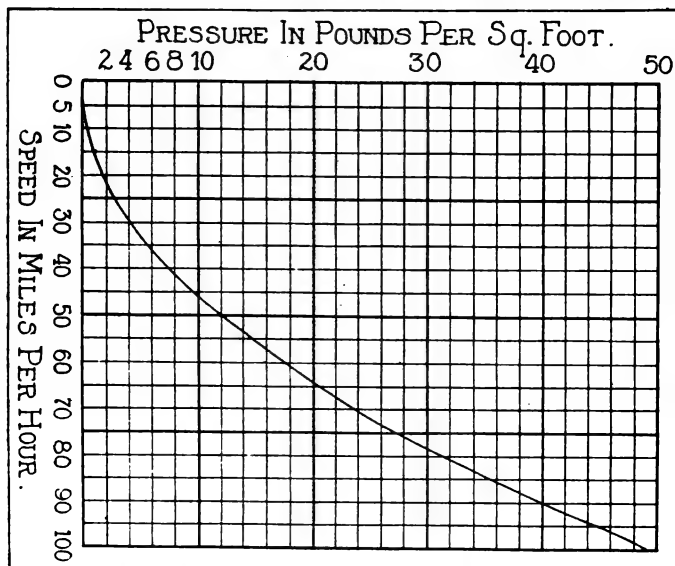


Fig. 536—Showing Wind Resistance at Varying Speeds.

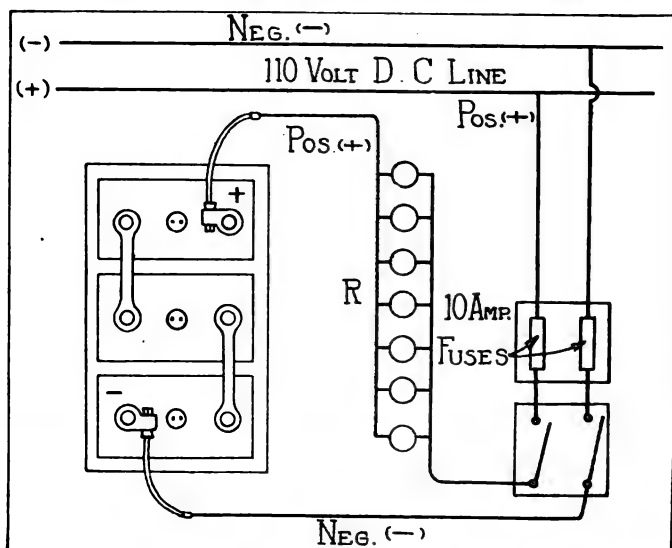


Fig. 537—Wiring Diagram for a Home-Made Storage Battery Charger.

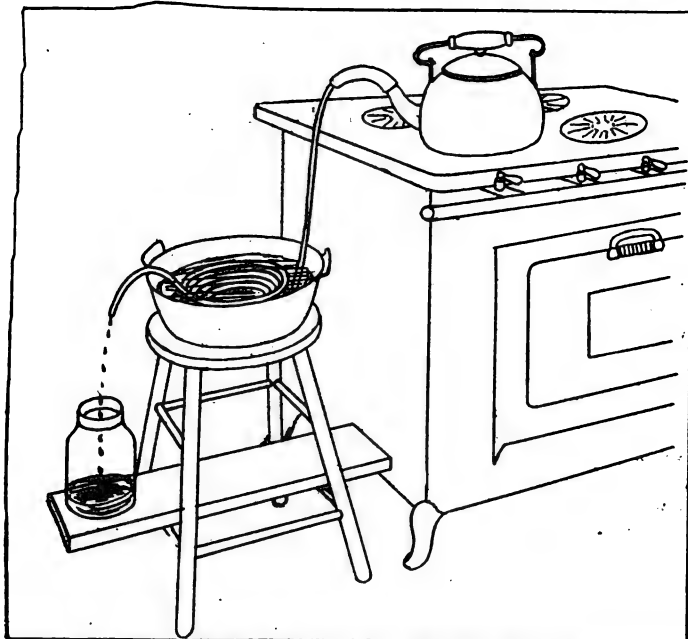


Fig. 538—Distilling Water for Storage Batteries.

and feeling for the slack while, with the right hand, the jack bar is given a slight up and down motion. Instead of a jack, a pinch bar, with fulcrum of suitable height, may be used for the same purpose.

MAKING DISTILLED WATER.

(Figure 538.)

Distilled water which is used in storage batteries is water that has been turned into steam and cooled and collected again. You can easily put up some for yourself at home with very little trouble. Coil a length of annealed copper tubing so it will fit in a dish pan, having each end in the position shown in the illustration. To the snout of a tea kettle connect one end of the coil by a rubber hose or tube and have the other end of the coil bent so the distilled water will drip into a bottle. Fill the dish pan in which the coil is placed with water, which must be kept cool either by frequent changing or by allowing a fresh supply to run into it during the process. When the water in the tea kettle begins to steam it will pass through the snout into the tube and through the coil, where it will be cooled and condensed into water again. It falls into the bottle as distilled water, being as pure as desired for storage battery purposes.

JACKING WITHOUT A JACK.

(Figure 540B.)

The means by which this may be accomplished is through raising one end of a short plank with a block of wood, a couple of bricks or any other "packing" material handy, thus forming an incline up which the wheel in question may be made to mount by driving the car in low gear. About a foot beyond the high end of the incline the packing blocks are placed, built up to a height of about two inches more than the normal clearance under the axle. On driving the car further ahead the axle drops down on this packing, leaving the wheel clear of the ground. To get the wheel back to "terra firma" it is easy to topple the packing over by pushing the car forward.

SILENCING TAPPET NOISES.

(Figure 539.)

The practise of lengthening the stems or tappets was once a common method of silencing noisy valve tappets, but at best it is unsatisfactory. In fact, it is productive of other troubles as serious and annoying as the noise and lack of power

due to insufficient valve opening. Most all cars made today have adjustable tappets, and by taking a little time it is possible to provide the same advantages for cars without this feature. This is often done in one of two ways. The first and

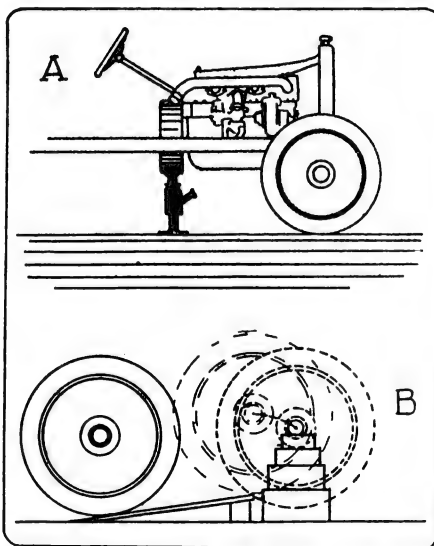


Fig. 540—(A) Locating Loose Bearings; (B) Jacking Without a Jack.

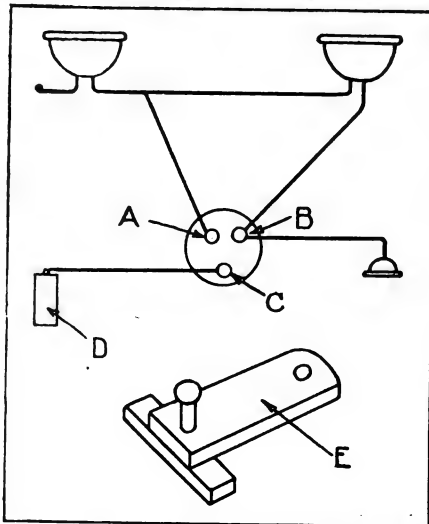


Fig. 541—Wiring for Ford Car Lights.

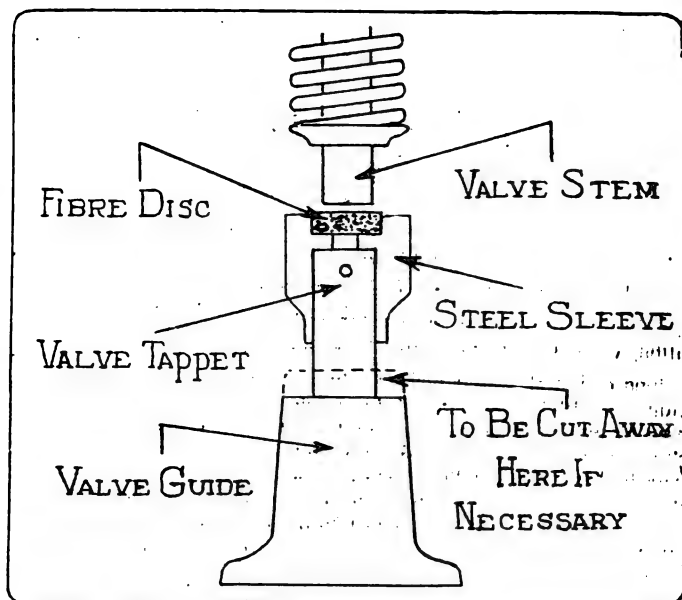


Fig. 539—Practical Method for Rectifying Noisy Valve Tappets.

best method can be used only where there is sufficient material to work on. Assuming that you have the material, the first thing to be done is to have the tappets removed and have the hardening or temper taken out of them. This you can do yourself by heating the pieces to a dull red heat and allowing them to cool while immersed in a bed of sawdust. While this is not a very exact method, it is approximately perfect for the work in hand.

Having annealed the tappets it is best to cut about $\frac{1}{8}$ inch from them, and also on each cut a fine thread, fitting a crowned nut and a shallow nut for a locking device. The crowned nut should be hardened and it is best to have it done by some one having experience and knowledge in this line. This scheme will be found to give you adjustable tappets that will wear a long time and may be adjusted to give as little noise as desired by exercising a little patience while doing it.

The other method is the one used before the adjustable tappet became so common. This consists of fitting a steel sleeve over the top of the push rod and in this sleeve make a recess to be filled with a piece of hard fiber compound, the whole to be held to the rod with a pin. This plan is shown in the illustration. If the cross section of the push rod is large enough the sleeve may be eliminated and the fiber packing inserted in a hole drilled in the top of the push rod.

FORD HEADLIGHT CONTROL

(Figure 541.)

Everyone knows that when the Ford car engine is running slowly on high speed the headlights do not furnish such a bright driving light as is given when the engine is running at full speed. Quite frequently it is necessary to drive through bad roads where the car speed does not exceed eight miles per hour for half an hour at a time. It is then that full light is most necessary, but not obtainable with the present wiring. We give a suggestion for wiring the Ford car in such a way that this annoyance may be minimized, as shown in the accompanying diagram. A, B and C are the three points of an ordinary switch, D is the magneto terminal. The insert E shows the switch bar, which swings on C, and the method of soldering a cross bar so that A and B may be connected at the same time. With the switch covering A and B a concentrated light is obtained in the left headlight. With the switch thrown to B only both headlights are lighted. Care should be observed not to run with the engine speeded up and only one light burning, as the light bulb will be burned out.

Directory of Automobile Accessories, Parts and Supplies, With Descriptions, Illustrations and Prices

IN OFFERING the trade an up-to-date list of accessories, parts, fittings, machinery, tools, equipment and supplies, with descriptions, illustrations and prices of articles that are now in production or which are carried in stock and can be secured by jobbers and dealers, the Accessory and Garage Journal and Automobile Journal is offering a service that can be obtained through no other medium. This information is being compiled from the most recent advices direct from manufacturers.

The trade in the motor industries, whether dealing exclusively in automobiles or not, does not have to be told that from now on and for an indefinite period they must engage largely in the business of selling accessories, supplies and equipment. All must specialize in the repair, and the buying, selling and rebuilding of used cars if they intend to make money as in the past. Possibly

extra effort will be required to keep business running as usual owing to conditions in the manufacturing field and difficulty of obtaining material and stocks. There is nothing in the situation to warrant the belief that there is to be any decided let up in the demand for all kinds of lines that are used in repairing or equipping automobiles, as there are over 5,400,000 cars being operated.

It is no time for rapid retrenchment. If a dealer feels pessimistic to the point that he keeps his stocks on a hand-to-mouth basis he better retire while he is whole as nothing will run him to the ground quicker than such a policy. The man who secures a good line of supplies and equipment this fall and winter, while obtainable, will have the goods to deliver for winter and spring business, which should be marked by a greater demand than in any previous season. All factors in the situation point to this condition. With few new cars to be deliv-

ered everyone of the 5,400,000 owners will of necessity purchase more accessories, supplies and equipment. Those who have very old cars in order to run them another year will have much repair and replacement work to do, while the millions of owners who have each year purchased a new car will spend a considerable amount on their machines to put them in first class shape. A condition indicated by their custom in the past of buying a new vehicle each season.

In the descriptions given where no mention is made of the maker's ability to deliver goods, it is to be assumed that the same situation would exist under normal conditions and that the article is procurable subject to the same transportation and manufacturing considerations as would obtain in these times.

Owing to present publishing conditions extra copies cannot be supplied, so it will be advisable to place subscription orders at once.

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Rain-Sno Clear View Windshield Cloth, as its name suggests, affords a means of providing against an obstructed view through the windshield from rain, sleet, snow or fog, and this result is secured at a minimum expense and with least possible effort, as an occasional wiping of the glass with the cloth prevents water in any form from adhering to the surface.

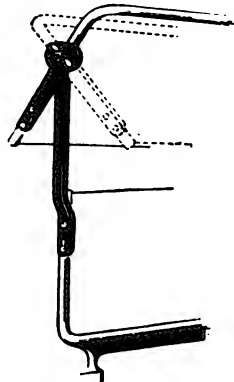
The use of this cloth for keeping a clear view through the windshield in stormy weather presents many advantages. It does not require constant handling to accomplish the desired result and when not required can be stored in a small pocket in the door or in under the seat. It is guaranteed to give continuous

RAIN-SNO
CLEAR VIEW
WINDSHIELD CLOTH

and effective use for one year and is a cheap and simple means of preventing the many accidents that motor cars figure in owing to the driver's view being obscured by rain, snow or moisture on the windshield.

Manufactured by the Suffolk Manufacturing Co., Inc., Dept. D, 69 Long Wharf, Boston, Mass. By mail, postpaid, 50c each.

The Extension Swivel Hinges for Ford windshields, which have been placed on the market recently make possible the conversion of these shields into the "rain vision" type, which are used on practically all the larger cars and which have so many acknowledged points of superiority. Ford owners can enjoy the use of this type of shield now without incurring the expense of an entirely new frame and glass. With the use of these hinges the upper half of the glass becomes adjustable to any position either forward or backward and it can be so set that the operator can see the road in rain or storm without having his vision obscured by the accumulation of moisture



or sleet on the shield. It also affords a means of properly regulating the ventilation in front of the car and will direct a current of air as desired, keeping the legs cool and the dust, bugs and other flying objects from the eyes.

The change can be made in five minutes with the use of a screw driver, no drilling or machine work being necessary. There are three different models of Extension Swivel Hinges: A for 1912, 16, 17 Fords; B for 1913, 14 Fords, and C for 1918 Fords.

Manufactured by the General Auto Specialty Co., Inc., 151 Berkeley St., Boston, Mass. Price, \$3 a set.

The Shurnuff Combination Manifold is a one-piece casting combining the intake and exhaust, being cast integral and so constructed as to allow the exhausted or fired gases to pass over the intake in such a manner that the incoming vapor is properly mixed and dried before entering the cylinders, thus insuring a smoother



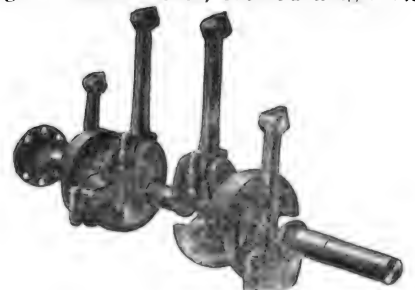
running and more powerful engine at all speeds and a saving of fuel.

Its efficiency in thoroughly vaporizing the mixture makes it possible to utilize the low grade gasolines, that have more heat units than the higher grades, which fact is responsible for the increased power, faster pick up and the ease in starting that results from the use of the combination manifold.

It is designed for the Ford engine and comes complete ready to attach.

Manufactured by the Shurnuff Manufacturing Co., St. Louis, Mo. Distributed by the Zinke Co., Chicago, Ill. Retail price complete, \$9; west of Rockies, \$10; in Canada, \$12.50.

Dunn's Counterbalances for all Ford cars are designed to balance the crankshaft, eliminating the vibration and giving the same smooth, even running motor



that are obtainable only in the very high priced cars. The unbalanced revolving weights traveling at a high speed set up wracking forces in an engine that will ultimately be responsible for ruinous wear in many of its parts, while all the time deteriorating the effect of the power impulses. It has long been a known and established fact that counterbalancing any engine that derives its power from a reciprocal stroke will increase its power and efficiency and greatly lengthen its service life.

Manufactured by the Dunn Counterbalance Co., 115 North 15th St., Clarinda, Ia. Price, \$12 per set.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Sun Ray-Lens has a lens which is divided into a great number of small square prisms, designed to throw approximately 90 per cent. of the light directly ahead of the car, in a line parallel with the road surface. These square prisms are separated from each other by small triangles, through which the balance of the light given by the bulb is refracted to the sides of the machine, at an angle of about 168 degrees, affording light for determining the ditch lines. Immediate delivery is assured.



Manufactured by the Prismolite Co., 74 East Gay St., Columbus, O. Write for prices and literature.

The Woodworth Clear Light Lens for automobile head lights is a prism lens especially designed to prevent glare without absorbing light, but by directing its rays where they are most required. The upper half of the lens is so designed that it throws the light to the sides of the



road and the lower half is designed to throw the rays down on the road itself. Prompt deliveries to dealers and jobbers.

Manufactured by Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices for set of two delivered: 8 to 8 1/4 inch, \$3; 8 1/4 to 9 1/4 inch, \$3.75; 9 1/4 to 11 inch, \$4.50; 25 cents per pair additional west of Rockies. Discounts: 25 to 60 per cent. according to quantity.

The Crew Levick Fractor consists of a heavy half tone of glass, which is cast with wedge shaped projections around the circumference. The glass is mounted upon a ring which fits over the bulb. Due to the peculiar construction of the glass



and its refractive power, the Fractor bends all the rays of light so that they are reflected where needed on roadway.

Made by the Crew Levick Co., Philadelphia, Pa. Motor Parts Co., Philadelphia, national sales agents.



The Conaphore is a typical headlight glass of the first class and is obtainable in sizes ranging from five to 11 1/2 inches in diameter, and in either plain or Noviol glass. Across the front of this glass are a series of horizontal prisms which refract the glaring beams and direct rays of light downward. A second series of squares, arranged in semi-triangular formation and extending over the center of the glass, are designed to reflect light towards the sides of the road. All of these prismatic panes are cast into the glass and being on the inside do not collect the road dirt and dust. The front is perfectly smooth. The Noviol glass being of yellowish tinge, absorbs the glaring rays of blue and violet and permit only the non-glaring rays to pass.

Marketed by Conaphore Sales Division, Edward A. Cassidy Co., Madison Ave. and 40th St., New York.

	Noviol	Clear
Retail Price List (per pair)	Glass	Glass
5 to 6 1/4 inches incl....	\$2.40	\$1.60
7 to 8 1/4 inches incl....	3.50	2.50
8 1/2 to 10 inches incl....	4.50	3.00
10 1/4 to 11 1/2 inches incl....	6.00	4.00

Prices 25 cents more per pair west of Rocky Mountains. Sizes vary by steps of 1/4-inch above 6 1/4-inch size.

The Lennon Light, patent rights to which have been affirmed by the United States Court of Appeals, is a flexible brass reflector, heavily plated, which throws the beams of light on the road, and at an approved height from the ground, stops the glare which is prohibited by statute in many states. It is made in two sizes and will fit any headlight. The protectors are light in weight and simple in construction, having no extra springs or parts to become broken.

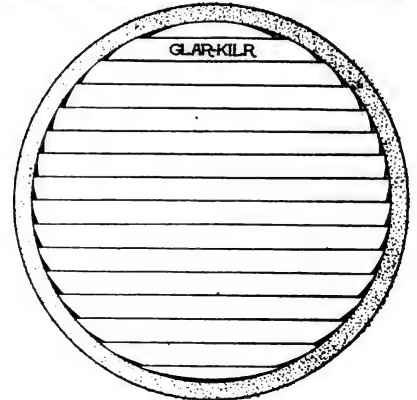


They are attached without removing the bulb from the headlight, the operation being to place the eyelet of the protector over the tip of the bulb and pressing it into position, where it is held firmly. Those rays of light that ordinarily would be thrown outward and upward into the eyes of oncoming motorists are reversed and directed downward. Prompt deliveries are assured.

Manufactured by J. H. Faw, Inc., 37 Warren St., New York, N. Y. Retail price \$1 per pair.

The Zorger Glar-Klir Lens is composed of sectional cylinders one-half inch in width, with the axis horizontal. These sections are adjusted so that the rays cross or come to a focus three inches in front of the reflector. This gives a one-half inch spread every three inches or a two-inch spread every foot. The sectional cylinders are made so that the light does not attain an altitude of more than 42 inches in 200 feet. At 200 feet the spread from each one-half inch section of

the glaring half of the reflector is 400 inches, 90 per cent. of which is stated to be below horizontal is diluted by diffusion approximately 800 times, not nearly sufficient to dazzle an approaching driver. The maker states that by using the cylinder he gets the same diffusion as any diffusing lens and in addition gets refraction or bending down of the rays. This lens bends rays of light down and diffuses them along the road where they are needed. The range of lighting from it is from 300 to 500 feet in front of the car, and a wide side light is thrown, showing clearly the side of the road. Orders can be filled promptly and in any quantity.



Manufactured by the Zorger Lens Co., Inc., Champaign, Ill. Prices, 7 1/4 to 9 inches inclusive, \$2; 9 1/4 to 10 1/2 inches inclusive, \$2.50; amber, 50c extra.

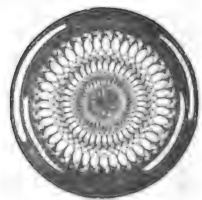
The Macbeth Lens has its front surface divided into five horizontal prisms, each of which is inclined at an angle that was determined by experiment. This arrange-



ment is said to direct the light below the horizontal, lighting the path of the car at the greatest distance possible, without having the glare of the lamps blind the driver of an approaching machine. A concave surface at the back of the lens results in the deflection of the rays to the sides. To eliminate any chance for rays to extend upward, the lens is fitted with a green visor, making the whole device ornamental.

Manufactured by the Macbeth-Evans Glass Co., Pittsburgh, Pa. Write for prices and literature.

The Nu-Ra-Lens is an attractive headlight glass, which is designed to prevent direct ray action with the attendant glare. This type of lens is mosaic in effect, with its surface broken into many small prisms, which deflect the light, but do not dim it. In this way all of the light from the bulb is thrown in front of the machine, but not in the form of direct rays.

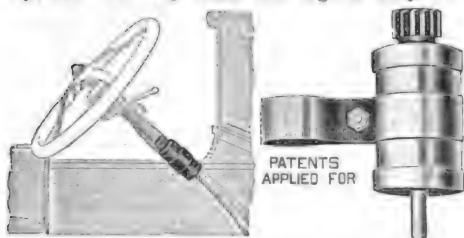


The manufacturers claim that though a perfectly white and clear light is projected, it possesses none of the objectional glare common to clear glass lenses.

Manufactured by the Nu-Ra-Lens Co., 74 East Gay St., Columbus, O. Prices from \$2 to \$3 according to size.

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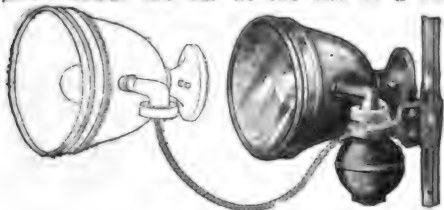
The Lite-A-Ford is an intensifying and regulating device for lighting systems of Ford cars with a dimming feature. By a series of coils the current from the engine is strengthened at low engine speed, while the same coils have a reverse action on high speed, causing the current to be retarded. This regulates and equalizes the lights to almost an even density at all speeds. At any time the lights may be



dimmed to any degree that it is desired by turning the knobs on the dimmer, which is attached to the steering column. Prompt delivery.

Manufactured by Hastings Manufacturing Co., Hastings, Mich. Price \$2.50.

The Autoreolite is a spotlight, a searchlight, a flashlight and a trouble light all in one. It costs no more than the ordinary spotlight and it is moveable to any point about the car at the end of a 12-



foot extension cord, that when not in use is wound on an automatic reel.

Manufactured by the Anderson Electric Specialty Co., 118-124 Clinton St., Chicago, Ill. No. 3140, model B-6 (six inch), price with rear view mirror, \$8; No. 3141, model B-7 (seven inch), with rear view mirror, \$9; without mirror deduct 50 cents.

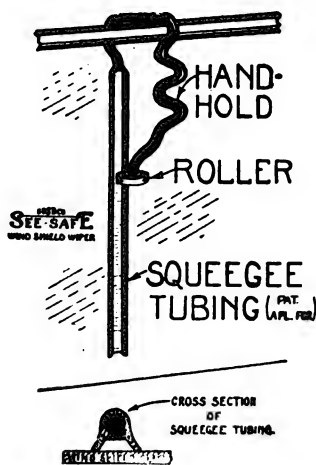
The Automatic Extension Reel is nine inches in diameter by two inches in width, and is equipped with 25 feet of reinforced cord. The head is provided with a swivel joint, enabling one to carry the lamp in any direction from the reel, and an automatic lock, so that stop may be had at any point. It combines the advant-



ages of taking the light exactly where it is wanted, eliminating the necessity of dragging an extension cord over the floors, where the insulation is soon worn off and fire risks increased through short circuiting. The makers claim that so perfect is the reel's insulation and connections that they have withstood a test of an A. C. potential of 1250 volts—only 250 being required for lamp service. Orders filled promptly.

The Cincinnati Specialty Manufacturing Co., Inc., Cincinnati, O. Write for prices and literature.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

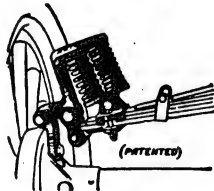


The See-Safe Windshield Wiper is so arranged that it may be drawn across the windshield, cleaning a rectangular space, or pivoted upon the top and swung in a half circle, serving to clear a space or cleaning the rain, moisture or sleet away from the windshield for its full width. The distinctive feature of the wiper is gained through the use of a special squeegee tubing. The effect of this tubing is that two flexible and parallel wiping surfaces are in contact with the glass, held closely against it by the spring action of the heavy rod on which it is mounted, and which passes over the top of the windshield and forms a hand-hold on the inside of the car.

Jobbers and dealers can secure a supply of the wipers during the entire fall and winter.

Manufactured by the Stadeker Metal Specialty Co., 358 W. Madison St., Chicago, Ill. Write for prices and literature.

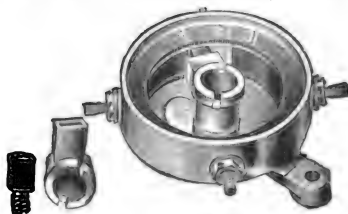
Champion Shock Absorbers are built exclusively for Ford cars and are designed to absorb the jar and recoil from the springs. The pivot seat of the two coil springs act as a bearing for the main springs and allow free oscillation of the



working parts. The car rides on the springs and off the springs, equalizing each motion in balance, making the action of one spring compensate for that of the other. Immediate deliveries.

The Champion Shock Absorber Sales Co., Indianapolis, Ind. Two for the rear wheels, \$8; set of four, \$15.

The "Hyway" Oilless Timer is developed on the system of brush contact used on all electric generators. The brush is special machined of hardened brass, slightly curved to fit the ring. It can be quickly and easily renewed when worn and is the only part necessary to be changed. This timer does not need to be oiled and gives a 50 per cent. longer contact, insuring a



fat spark, which makes for better ignition. Deliveries can be made as wanted.

Manufactured by Staff & Eckhouse, 1432 S. Michigan Ave., Chicago, Ill. Price \$1.25.

The Velvet Recoil Deadener, marketed by the makers of the Velvet Shock Absorbers is designed to restrain and soften the recoil of the springs.

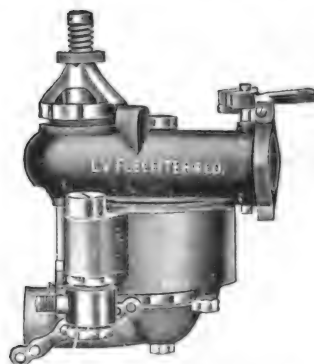
As will be seen by reference to the illustration the cam A is fastened stationary on the pivot bolt B, while the drum revolves on the bolt B. The spring C is fastened to the inside of the drum and when the car goes upward the drum revolves on the pivot B and the spring travels upward on cam A, gradually stopping the upthrow of the car. A spring on the opposite side of the device winds back the drum and the spring C immediately slides down on the cam A as the body of the car returns to normal position, and takes up the slack in the strap. Deliveries can be obtained on a reasonable



amount of Velvet Recoil Deadeners for large cars and Ford cars, also on Velvet Shock Absorbers for large cars.

Manufactured by the John W. Blackledge Manufacturing Co., 341 East Ohio St., Chicago, Ill. Write for prices, giving name of car.

The Flechter Carburetor's correct principles of vaporization and air mixing have been combined with simplicity of construction to a degree that insures unusual fuel economy with reliability of operation. Complicated adjustments that can only be properly set by experts have been eliminated entirely. In this carburetor a "fixed" nozzle or spray is employed. The orifice of this jet is calculated for the size of the carburetor and the type of engine on which it is employed, and it is unalterable, the only adjustments necessary being those regulating the air supply. The air adjustments act directly on the amount of air admitted and are of the simplest form. They are placed on top of the carburetor and will lock at any point for which they are set.



Both the low and high speeds are plainly marked so that they can be turned to the proper direction. Deliveries can be made in any quantity.

Manufactured by L. V. Flechter & Co., 192-200 Jackson Ave., Long Island City, N. Y. Write for prices and literature.

The Moto-Meter is now being made in a special type for the owners of Ford cars, as they are likely to be just as ambitious as an owner of a much bigger machine to have their equipment complete, and, therefore, it comes to pass that makers of accessories of almost every kind have offered models especially adapted to the needs of Ford owners. And not to be left behind the makers of the Moto-Meter have added to their line a special Ford model, which is sold complete with a nickel plated radiator cap. The Ford Motor-Meter differs in no wise, so far as principle and operation are concerned, from other models. It indicates by means of a column of colored fluid, plainly visible in the middle of a disk, the temperature inside the radiator, so that any trouble which tends to increase engine temperature at once betrays itself by pushing the column upward. It is well



known that most engine troubles make themselves manifest in the form of heat.

Manufactured by the Boyce Moto-Meter Co., Inc., of Long Island City, N. Y. The price of the new instrument, including the radiator cap, is \$2.75. The Standard model costs \$10, the Overland \$10, the Junior \$5 and the Midget \$2.50.

Micro Piston Rings are made in two parts and designed to eliminate piston compression leakage. The outer ring seals the opening in the inner ring, and it



is said that an equal expansion against the cylinder wall in all directions, produces perfect contact at every part. The makers can meet the demands of the trade and make prompt deliveries.

Manufactured by Micro Piston Ring Co., Inc., 110 Nassau St., New York. Prices upon application.

Rico Auto Cleaning Brushes, which line includes a wire wheel brush, wheel and hub brush and engine brush, are made of real China bristle, and are designed and shaped to meet the exact needs required



In thoroughly cleaning a car with the least trouble.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Prices, wire wheel accelerator brush, \$1; wheel and hub brush, \$2; engine brush, 75 cents.

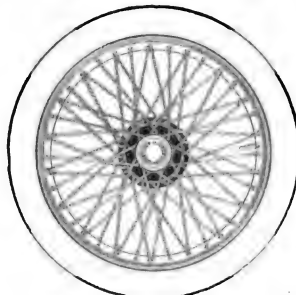
Perfection Double-Tang Sockets meet the demands of the time for conservation of steel, products and labor, as through their use any taper shank tool with a broken tang can be quickly and permanently reclaimed. When the tang of a tool breaks the workman steps to a grindstone and within several minutes has ground a new one, which is 25 to 60 per cent. stronger than the original. This tang is slipped into the socket and as any of the "P. D. T." sockets will nest into a



similar socket of the next larger size, any desired length of tang can be obtained. These sockets will also hold taper shank tools so that the tang will not twist off; can't get out of order, as there are no loose parts; fit any spindle with a regular taper hole.

Manufactured by the Cleveland Twist Drill Co., 9 N. Jefferson St. Chicago, Ill. Write for prices and literature.

The House Type Wire Wheels for Fords are less liable to collapse under the shocks of violent collision or skipping blows than the wooden wheels. Each spoke will stand a strain of 3200 pounds. There are 54 spokes in a single wheel. A set consists of five wheels, four inner hubs, four hub caps, one dust cover for spare wheel and two wrenches, one for



the hub caps, another for the spoke nipples. These wheels will stand up and keep going under all road conditions. The inner hub has 10 tapered serrations that fit into and grip the corrugations inside the hub shell. The mechanical locking latch is inside the hub cap and is released by a special wrench, but locks itself automatically to the inner hub.

Manufactured by the Wire Wheel Corporation of America. Factories: Buffalo, N. Y., and Springfield, Mass. Service department headquarters, New York City, N. Y. Direct factory branches and service stations in New York, Philadelphia, Chicago, Detroit, Los Angeles and San Francisco. Set of 5 wheels \$65. In black, white or red enamel.

Brown Automatic Oiling and Grease Bolts are used extensively by automobile manufacturers who turn out a high class product. The automatic oiling bolt, while designed primarily for use as a spring shackle bolt, is adaptable to all kinds of mechanisms needing continuous feed for internal lubrication. Lubrication is effected by means of a reservoir wick or felt, positively attached to a threaded cap plug and one or more feed or filter wicks. When in position the reservoir is under slight compression that forces all surfaces of the felt against the interior of the bolt, the feed or filter wicks resting against the main reservoir and carrying oil to the bearing surfaces by capillary attraction. The bolts are made from cold drawn bar stock, heat treated and ground and are made in sizes of from 1/4x3 inches to 1x6 inches.

Manufactured by the Brown Co., Syracuse, N. Y. Write for prices and literature.



The G. L. T. Push and Pull Rim Tool is unlike all others in manner of operation and construction. The makers claim no pinching of the fingers or torn clothing, breaking tools or hammering rims out of shape in an effort to remove or replace rims from or to tires. The sliding or adjusting bar that must move to and fro travels in an E shaped heavily ribbed channel. There are no loose hooks, all parts firm and rugged. The slot in the connecting link allows adjusting bar to move backwards, allowing tool inside for unlocking rim, pushing joint apart and pushing rim and joint to place, also allowing bar to move forward for attaching hooks to outside of rim for pulling or contracting rim for removal of tire. It requires but a few seconds for the entire operation and the tool is very substantial.



of all steel construction, durable, simple and easy to operate.

The tool is made for and adjustable to 30, 31, 32, 33, 34, 35 and 36-inch demountable split rims.

Jobbers and wholesalers can obtain prompt deliveries.

Manufactured by the Metal Products Manufacturing Co., 2416 University Ave., S. E., Minneapolis, Minn. Prices, plain, \$3.50; japanned, \$3.75; anti-rust, \$3.85; white nickel, \$3.95; bronze, \$3.95, \$4.25; oxidized, \$4.50; polish nickel, \$4.75.

Spoke Tite is a liquid preparation which tightens loose spokes and stops body squeaks. It is said to be uninjurious to painted or varnished surfaces and when applied causes the wood to swell and resume its normal proportions. The can is furnished with a handy spout and upon signs of looseness in the wheels a few

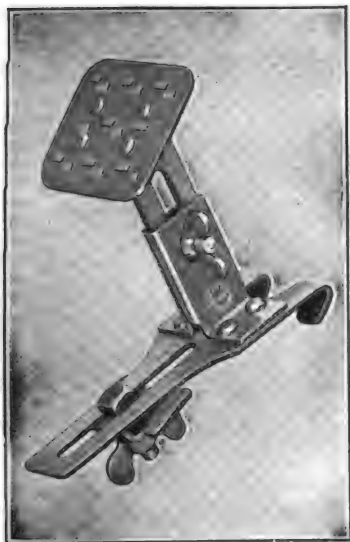


drops of Spoke Tite are squirted into the crevices formed by the drying up of the wood. The wheels may be left in place for the treatment and the action of the liquid is rapid. Prompt deliveries are assured.

Represented by Charlie Foster, 243 Columbus Ave., Boston, Mass. The price per can is \$1.50, enough for four wheels. Distributed by Asch & Co., 16-24 W. 61st St., New York City, and Gray, Heath Co., 1440 Michigan Blvd., Chicago.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

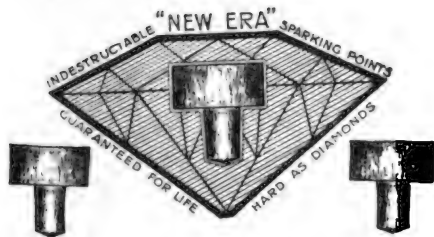
Rico Universal Extension Pedal fits every type of automobile brake and clutch pedal and makes it possible for anyone to accommodate their reach to



any driving position desired. It is easily and quickly attached and when in position is absolutely rigid.

Manufactured by the **Rich Manufacturing Co.**, 1777 Broadway, New York City. Price, per pair, \$4; with rubber cushions, \$5.

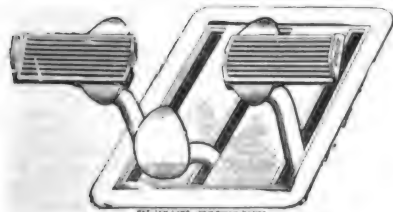
New Era Indestructible Sparking Contact Points are successfully used on all ignition systems except Bosch and replace worn vibrator points, or points in magnetos. They are made from an alloy of materials which the makers claim are harder than platinum. These points, the makers say, are indestructible and they back this claim with a broad guarantee of full replacement at any time, no matter what the reason.



- No. 1, 9 Ga. wire, $\frac{1}{2}$ " deep. Shank $\frac{1}{8}$ " long....\$1.00
- No. 2, 12 Ga. wire, $\frac{1}{4}$ " deep. Shank $\frac{1}{8}$ " long....\$0.60
- No. 3, 9 Ga. wire, $\frac{1}{4}$ " deep. Shank $\frac{1}{8}$ " long....\$0.75
- No. 4, 10 Ga. wire, $\frac{1}{2}$ " deep. Shank $\frac{1}{8}$ " long....\$1.00

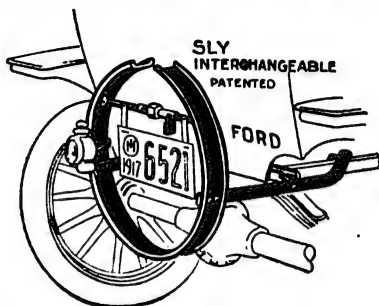
Manufactured by the **New Era Spring and Specialty Co.**, 1177 Hamilton Ave., Grand Rapids, Mich. Prices from 60 cents to \$1, according to sizes. Dealers, 50%.

Utility Sure Grip Pedals for Fords are made of pressed steel finished in black enamel and are equipped with heavy pads of rubber edged with metal. They are easily and instantly attached without the use of drilling tools, the tightening of a nut being all that is necessary to hold them securely in place.



Manufactured by the **Hill Pump Valve Co.**, Archer Ave. and Canal Sts., Chicago, Ill. Price, \$1.25 per pair.

The **Sly Interchangeable Tire Holder** is designed for both Ford and Chevrolet cars. It resembles a quick detachable rim and is bolted to the rear of the car. When the tire is in place an expanding device is turned, locking the tire upon the rim or holder, and can be used with or without demountable rims. A padlock prevents



the loosening of the expansion nut and prevents removal by an unauthorized person. On the holder are provided places for a number plate and a tail lamp.

Manufactured by **New Era Spring and Specialty Co.**, 1177 Hamilton Ave., Grand Rapids, Mich. Price, \$5. Special terms to jobbers.

Titanic Springs are strengthened by a reinforced patented arch and attached to a clamp entirely outside the spring. These springs, the makers claim, are guaranteed forever against center breakage, and for one year against breakage at all.



Quick service is claimed by the manufacturers who keep a large stock of ready-to-ship springs for practically every make of standard cars. Distributing stations are established in all large cities throughout the country.

Manufactured by the **Tuthill Spring Co.**, 700 Polk St., Chicago, Ill. Write for prices and literature.

The **Buffum Buick Valve Remover** is quick, sure and safe, obviating the danger of bending washers, valve stems and valve springs or breaking the valve cage. It lifts the valve straight up with a strong, steady pull and fits Buick engines of all models since 1912. It is light and compact and occupies no more space than an ordinary wrench, being easily carried in the tool box. They are sold by practi-



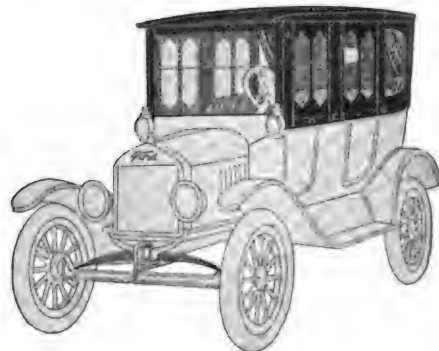
cally all jobbers and dealers in automobile accessories.

Manufactured by the **Buffum Tool Co.**, Louisiana, Mo. Price, \$2.

The **Cozy Top** for Ford cars embodies the features of the "Springfield" permanent top construction. It affords all the comforts and protection provided by the coupe, sedan and limousine types of body, and it also greatly improves the appearance of the car.

The strong feature of the Cozy Top is the Hunter Automatic Curtain, which is the most ingenious and practical device invented for this purpose. It is always ready and yet never in the way. It is out of sight under the roof when one wants the car open and in one second the car can be closed without leaving the seat.

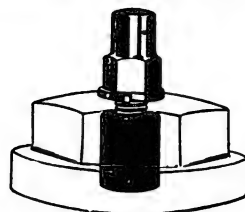
This top is carefully crated and shipped knocked down, in order to secure the low-



est possible freight rates. The Roadster Top is shipped in five pieces, the Touring Top in seven pieces. It requires no special tools to put it on the car—just a hammer, a wrench, a screw driver and about one hour's time.

Manufactured by **Founts & Hunter Co.**, Terre Haute, Ind. Write for prices and descriptive literature.

The **Imperial Gas Tank Seal** meets the call of the times for gasoline economy. Perhaps the greatest waste of gasoline has been the one least thought of—that which evaporates or is jolted through the vent hole of the gasoline tank. Tests at the Armour Institute of Technology and the Associated Engineering Laboratories



have proved that this waste of gasoline can be stopped by the Imperial Gas Tank Seal. It works equally well with gravity or vacuum systems and is so simple it cannot get out of order. The valve admits air automatically to replace the gasoline that is drawn out. It is easily installed in a few minutes time, fitting in a hole in the filler cap three-eighths of an inch in diameter.

Manufactured by the **Imperial Brass Manufacturing Co.**, 517 S. Racine Ave., Chicago, Ill. Price, \$3.

The **Goodell-Pratt Pocket Screw Driver No. 231** is especially handy around the automobile for the reason that it is always handy in the pocket. The handle

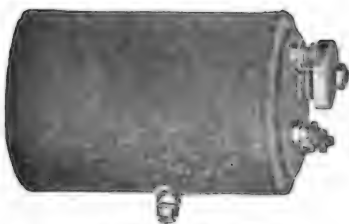


is made of steel, nickel plated, so that it will not rust. The chuck may be reversed and fitted into the handle in such a manner that the extreme length of the tool is but $3\frac{1}{4}$ inches.

Manufactured by the **Goodell-Pratt Co.**, Greenfield, Mass. Price, \$1.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Automobile Ignition Coil situation has in the past been a serious problem for jobbers, dealers and service stations, owing to the multiplicity of types on the market. Many jobbers and dealers have had to pass up the coil field almost entirely because of the large and varied stock of coils that would be necessary to take care of all requirements.



Jefferson Remy Coil.

The Jefferson Electric Manufacturing Co. of Chicago have recently placed on the market a line of battery replacement coils and fittings which are sufficiently flexible to displace any type of coil on battery equipped cars. The extreme flexibility of Jefferson coils is obtained from several features, which include the fittings, adjustable caps, terminals and mounting arrangements.

With a small stock of Jefferson coils any service station, garage or repair shop will be prepared for any emergency. Heretofore it has been necessary to lay up a car for perhaps several days while a new coil was being obtained. Now, however, any car can be placed in service within a few moments. It is only necessary to remove the old coil and connect the Jefferson.



Jefferson Delco Coil.

Starting conditions require a coil that will produce a hot, intense spark when the battery is at the lowest ebb. Jefferson coils are guaranteed to take care of this extreme condition.

To aid jobbers, dealers, service stations and garage men the Jefferson Electric Manufacturing Co. have compiled a folder containing complete and authentic data covering all standard battery ignition systems. This folder lists all makes of cars from 1912 to the present date and gives the year, model, type of ignition and style of Jefferson coil to be used for replacement. This folder will be sent free of charge to any dealer, garage, service station or jobber. Deliveries from stock.

Manufactured by the Jefferson Electric Manufacturing Co., 429 South Green St., Chicago, Ill.

The Jewell Battery Gauge is a finely adjusted volt meter permanently located in the battery circuit and so calibrated that the slightest variation in voltage is immediately indicated. The dial is divided into three parts, marked "Battery Full,"



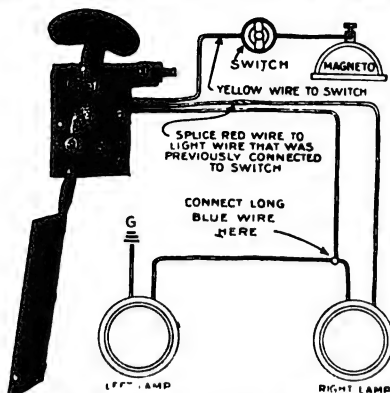
"Danger" and "Battery Empty," respectively, with instructions in each of the latter two compartment sections showing

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what should be done in the event the indicating needle marks these sections. The installation involves only placing of the gauge on the instrument board or any other convenient location and connecting the two binding posts on the back of the gauge to the main terminal of the battery, all of which is done in a few minutes.

Distributed by the Gray-Heath Co., 1440 South Michigan Ave., Chicago, Ill. Price \$6.

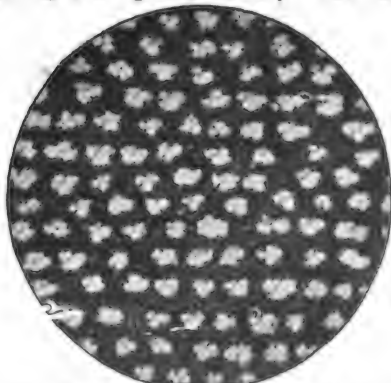
New York Automatic Head Light Controller for Ford cars eliminates trouble of varying light given by the car headlights. The Rear Light Controller consists of an arm which is attached by means of a stud to the base of the device. To the lower end of the swinging arm is attached an aluminum disc, which



when in position on the engine is about eight inches back of the fan. The base is fitted with three contacts, over which the swinging arm travels. When the engine is started the arm, by spring tension, is brought to the first contact and only the left headlight receives current. The total current from the magneto is sufficient to illumine this single headlight to its full candle power. As the engine speeds up the air current, acting on the swinging arm disc, carries it to the second contact and both bulbs receive current. Should the engine speed increase still further the arm would contact with the third connection and a resistance coil introduced into the circuit, preventing the burning out of the lights from excessive current.

Manufactured by New York Coil Co., 338 Pearl St., New York, N. Y. Price \$6 complete with wiring.

The Willard Threaded Rubber Insulation is one of the most important of many marked improvements which the Willard organization has made in the automobile starting and lighting battery. The illus-

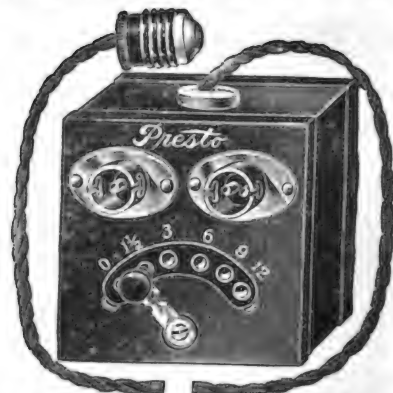


tration, which is greatly enlarged, shows a section of the threaded rubber insulation used between the plates of the battery. Each white spot is the end of one of the 196,000 threads which pierce the rubber plate or sheet from front to back. Each one is in reality only 1/32 of an inch in length and of such small diameter that it is not noticeable to the naked eye. The plates are perfectly protected and the solution has free passage by capillary attraction and because of the enormous

number of threads the full power of the battery is always available.

Manufactured by the Willard Storage Battery Co., Cleveland, O. Write for prices and booklet entitled "The Wick of the Still Better Willard."

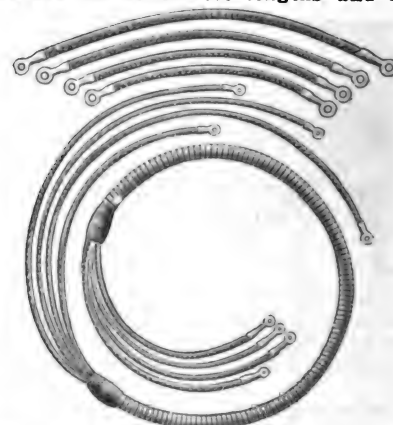
The Presto Bulb Tester is designed to test all sizes of automobile bulbs that have an Edison base and the dealer when selling a bulb can test it before



the purchaser's eyes, thus proving that the bulb is perfect and also that it is of the correct size for installation on that particular car. The switch lever at the front has contact points for 1½, 3, 6, 9 and 12 volt bulbs. It can be attached to any ordinary 110 volt socket and is equipped with seven feet of lamp cord. The device is enclosed in a neat metal case of black enamel with trimmings of nickel plate. Prompt deliveries.

Manufactured by the Metal Specialties Manufacturing Co., 338-52 N. Kedzie St., Chicago, Ill. Write for prices and literature.

Ford Ignition Outfits include a complete set of primary and secondary wiring of the highest grade wire. The cables are cut to correct lengths and fin-



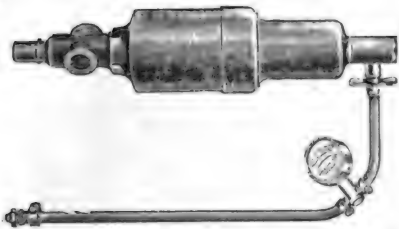
ished with soldered terminals or black rubber nipples if so desired. Low tension wires protected with cable insulation are furnished where the wiring is exposed to grease or oil drippings. The wires are in contrasting colors, which make sure of proper replacement.

Manufactured by Staff & Eckhouse, 1432 South Michigan Avenue, Chicago, Ill.

Ohlo Karbon Killer is a compound which, when mixed with gasoline, eliminates old carbon deposits in the engine and prevents further accumulations according to the claims of the makers. It contains no ether, camphor, acid or other ingredient that would harm the motor or clog up the gasoline feed lines. It comes in condensed form and is used at the rate of one level teaspoonful to five gallons of gasoline. The amount to be used is dissolved in gasoline and then poured into the fuel tank. A can of one pound is enough to treat 480 gallons.

Manufactured by the Ohlo Grease Co., P. O. Box 22, Loudonville, O. Price per pound, \$1.

The Brown Impulse Tire Pump offers a simple, effective and ready means of inflating tires on automobiles without the laborious work of operating a hand pump. It can be used with any four-cycle motor and is attached in a moment's time by removing the core of the "B Co.'s" spark plug and putting the pump in its place. The tubing is then connected with the tire valve and the engine is



started. The impulses of the engine operates the plunger in the pump and the tire is filled with pure, fresh air to any desired pressure.

The pump is made of the best materials obtainable and is worked up with the same care as is employed in constructing a high class motor. Its construction is rugged and simple making it practically fool proof with ordinary care.

Manufactured by the Brown Co., Syracuse, N. Y. Price, \$12.

The New Amazon Cord Supertire is of multiple ply construction, each cord is separated from the others by an insulation of rubber. Each cord performs its functions independently. Friction and consequent heat are impossibilities. Its increased air space gives unusual buoyancy and resistance to stone bruises. Almost three-quarters of an inch of sturdy side wall above the bead makes it mechanically impossible for rim cuts to occur the makers claim.



The heavy tread is of the same design and compounding as the regular fabric Amazon Supertire. The new cord has a jet black, ebony tread, with a broad pearl gray side wall.

Manufactured by the Amazon Rubber Co., Akron, O. Prices: 34x4 1/4, \$67.25; 36x4 1/4, \$70.55; 35x5, \$83.00; 37x5, \$87.00; 36x6, \$108.50.

The Magic Vulcanizer is an ingenious little device that vulcanizes patches on inner tubes in five minutes time, disregarding all weather conditions. The patch is simple and effective. A lighted match applied to the chemically treated cartridge in the top of the tin cap provides the heat units necessary to penetrate the patch and in a few minutes the tube is perfectly vulcanized and ready for



instant use. There is no flame, no danger of fire and the strongest wind cannot blow it out. The complete outfit, including clamp and 12 vulcanizing patches take up small space in tool box. Prompt delivery.

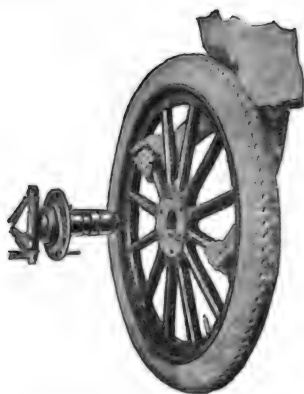
Manufactured by Magic Auto Devices Co., Inc., Lynbrook, N. Y. Price, \$2. Extra patches, the dozen, \$1.



The Universal Battery Charging Clips are for use as a quick and ready means of connecting storage batteries for charging. They enable one to charge lighting and starter batteries without disconnecting them from the car. Being made with spring jaws fitted with sharp teeth, they bite through dirt and corrosion on terminals and make contact with the metal certain. The trouble caused by loose connections is eliminated with this form of contact. Deliveries from stock for next eight months.

Manufactured by R. S. Mueller & Co., 424 High Ave., Cleveland, O. Write for prices.

Ford Demountable Wheels and Carrier are, the makers claim, a wonderful improvement over demountable rims. The tire change is easily and quickly made



by the simple removal of three nuts and without the soiling of hands or clothing. This wheel has less weight than demountable rims and a better balance, as most of the weight is centered at the hub instead of the rim. The outfit includes an extra spare Ford wheel and an artillery type carrier, which device adds materially to the appearance of the car and is instantly available when wanted. Prompt delivery.

Manufactured by the J. P. Gorman Co., Inc., 382 Canal St., New York City, N. Y. Price, \$15. Write for literature.

The Allen Tire Case has a patented water shed feature which the manufacturers claim make it absolutely water proof. The highest quality enamel duck is used. Its strong canvas backing and non-peeling coating make it the best possible material for the purpose. Style "1" is a regular stock cover in plain black enameled duck which harmonizes with any car. This style is also furnished in any solid color at \$1.50 additional. Style "2" is made of enameled duck or fabric leather with the body of the case to match the color of the car and the tread strips matching the trimming or running gear—or vice versa to order only. Style "3" is



the latest in case styles, made in fabric leather or enameled duck to match colors of car with beading to match the trimming. Prompt delivery.

Manufactured by the Allen Auto Specialty Co., 16-24 West Sixty-First St., New York City, N. Y. Prices, \$8 and up.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

Insyde Tyres are designed to secure additional mileage from tire casings, even those which have worn to a point where further use with the ordinary inner tube is impractical. They are made of heavy tough fabric, vulcanized together over tire molds so that they exactly fit the shoe. The outside is coated with rubber, which eventually vulcanizes itself to the casing and prevents slipping. The inside is treated in such a manner as to prevent it sticking to the tube. It is claimed that by means of an Insyde Tyre the air pressure strain is removed from the casing.



thus leaving it free to carry the weight of the car alone. Prompt deliveries.

Manufactured by American Accessories Co., 1700 Blue Rock St., Cincinnati, O. Prices upon request.

The Shaler Tube Vulcanizer repairs four tubes at one time and vulcanizes perfectly any size or shape of puncture or cut up to two feet in length. It is easy to operate and requires no watching or regulating, for it has automatic heat control. It takes up very little room and can be placed on a work bench or moved about



at will. Furnished with either a gas or gasoline burner or both. Prompt delivery. Manufactured by the C. A. Shaler Co., 252 Fourth St., Waupun, Wis. Type "L-40," \$35.

Wood's "Everloc" makes a permanent repair on the smallest puncture or largest blow out on tubes without vulcanizing. The patch comes rolled in container,



with tube of cement complete, and the makers claim a permanent job on any puncture from a nail hole to a cut or blow

out 17 inches in length, which can be applied in five minutes. Orders in any quantity filled promptly.

Manufactured by W. C. Wood Co., 74 Western Ave., Minneapolis, Minn. The \$1.50 patch is made in sheets 6x18 inches, \$1 patch 3½x18 inches, 50 cent patch 2x15 inches, and can be cut to any size desired. Large sheets will repair 100 one inch cuts, or 250 nail punctures.

The Weaver Universal Tire Changer is designed for the rapid changing or mounting of tires. It reduces to a minimum the time for changing quick detachable rim tires, split rim mountings or clincher



tires. The changing operation is entirely mechanical and the device is so arranged that little effort is required. The manufacturers claim that there is no damage to tire hazard present since all the pressure is brought upon the tire by means of roller contact. Orders filled immediately.

Manufactured by Weaver Manufacturing Co., Springfield, Ill. Write for literature and prices.

The Weaver Tire Spreader is a device for inspecting the interior of casings, which operation is always necessary in repairing every puncture, blow out or other damage to either tube or casing. By means of a quick acting foot lever the



casing is spread to its limit, thus exposing the interior for convenient and efficient inspection. It will be noted from the illustration that the convex plate which forms the table of the tire spreader is equipped with hooks, which after the casing is spread by means of the jaws, can be applied to the bead at each corner of the plate, thus holding the tire permanently spread and with a solid backing. The casing with the plate of the tire can then be lifted off of the spreader and carried to the buffing wheel and the break in the casing buffed to the best possible advantage. A nest of rollers, which are designed to protrude through the buffing plate, carry the weight of the tire when it is being revolved on the spreader for inspection. These rollers, however, are suspended on spring tension, which allows them to be pressed down flush with the

face of the spreader plate as the force of the jaws is applied to the beads of the casing for spreading. The shipping weight is 60 pounds. Orders filled immediately.

Manufactured by the Weaver Manufacturing Co., Springfield, Ill. Write for prices and literature.

No. 66 Brunner Air Compressor is a portable outfit designed for inflating tires direct, without the aid of a tank or storage system. It is mounted on a substantial cast iron truck having three wheels, and is very durable and convenient to move about. The handle is strongly constructed of convenient height, and has substantial hooks for holding the electric cord and air hose when not in use. It is heavily built with standard No. 26 compressor, having accurately ground cylinders, pistons and piston rings. The motor is specially built, fully enclosed, affording ample power for operation under all conditions, and it may be operated from any light socket. All accessories are included to make the outfit complete and ready to



operate when removed from shipping crate. A small chamber is supplied to precipitate the moisture from the air before entering the tire. Prompt deliveries.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Write for prices and literature.

The "Detroit" Crankshaft Tire Pump is driven directly from the front end of the engine crankshaft, being attached in exactly the same manner that the hand crank is connected. It is locked in position and held from turning by a clamp or screw and is connected to the end of the engine crankshaft by a short ball joint shaft or coupling, which drives it. Each downward stroke of the piston draws in clean, cool air, and each upward stroke forces it through the tube into the tire. The only attention necessary is a spoonful of hard graphite grease about once a season. It is made as carefully as a little engine. Cylinders, crankshaft and pistons are ground to close limit. Regular engine type high compression piston rings and standard engine type valves are used. Outfit includes 14 foot hose and connection for pocket gauge. Prompt deliveries.



Manufactured by the Detroit Accessories Corporation, Gratiot and Fisher Aves., Detroit, Mich. Price \$12. Write for size adapted to your car.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Standard No. 542 Brunner Air Compressor has a capacity of 2½ cubic feet of free air per minute. It is geared by means of a cloth pinion gear and a cast iron spur gear to a ½ horsepower motor, bolted to a substantial iron base, and is



mounted on a 32 gallon welded open hearth flange steel tank tested to 300 pounds. Its height is 34 inches and occupies a floor space of 18 by 36 inches and can be attached to any lighting socket.

Manufactured by the Brunner Manufacturing Co., Utica, N. Y. Price with 110 or 220 volt direct current motor, \$195. With one phase 60 cycle 110 or 220 volt A. C. motor, \$210. (A. C. motors of other than 60 cycle at additional charge). Write for literature.

The Foster Auto Repair Creeper is mounted on ball bearing, free running castors and is durably finished in baked-on black Japan. Metallic throughout it stands up under severe usage and its advantages over the wooden creeper are evident. The galvanized link spring fabric supports the body comfortably and the



head rests upon a cotton filled pillow. The give of the springs allows free movement and an adjustable arm anchors the creeper firmly to floor so workman can exert his full strength. Prompt deliveries.

Manufactured by Foster Bros. Manufacturing Co., Utica, N. Y. Price, \$4.

The Speederator combines a foot accelerator with an automatic controlled advance and retard for speed changing on the Ford car. It eliminates the necessity of any and all hand operation of the steering post throttle and automatically idles the engine in changing speed. When low or reverse clutches are engaged the engine is supplied with more gas automatically and speeded up. As soon as these clutches are disengaged the gas is automatically cut off, preventing the rac-



ing of the engine, and making the change from low to high, which is so difficult for amateurs, an easy matter. In addition to the automatic feature is provided a foot throttle or accelerator, rendering driving convenient and identical with high priced car methods of control. Prompt deliveries.

Manufactured by the Detroit Starter Co., Detroit, Mich. Price, \$4.85.

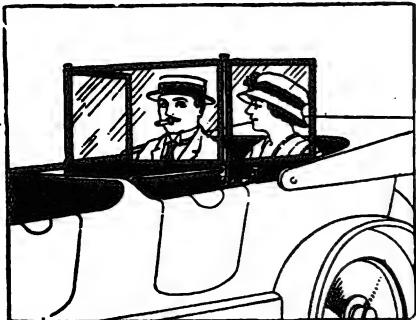
The Dodge King Bolt Wrench meets the long requested demand by repair men for a special wrench on King bolts and it is now manufactured in quantity so that the wrench can sell at the list of \$2.50, making the net price to the repair men so small that they cannot afford to be without one of these tools. It is made of the best steel and is light and compact, fitting the hand readily.



out one of these tools. It is made of the best steel and is light and compact, fitting the hand readily.

Manufactured by the Walden Worcester Co., Inc., Worcester, Mass. Price, \$2.50.

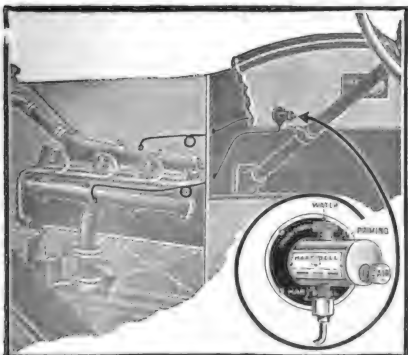
The "J. H." Tonneau Shield is adaptable for use on any car built. It is mounted on a pair of extending steel arms, which are attached to a pair of steel body irons, which in turn fasten securely to the frame of the front seat beneath the upholstery. When once raised a push enables one to open or close the shield and place in whatever position desired, whereupon it is held by the friction locks. The side wings are simply turned to whatever



position desired and they lock by friction. Placed at an angle they deflect the wind. When the shield is not in use it folds against the back of the front seat, taking about the same amount of room as would a robe. Orders filled promptly.

Manufactured by the "J. H." Tonneau Shield Co., New York City, N. Y. Price, \$60. Dealers' discount, 20 per cent.

The Hart-Bell Carbon Remover, which is easily installed upon the dash or under the hood, conveys a little water in controllable quantities to the intake manifold, where it becomes vaporized and is sucked into the cylinders with the gasoline. It is converted into steam by the heat of the explosion and allowed to act upon the car-



bon while the engine is running. An added feature of the device is an auxiliary air adjustment, making it possible to in-

duce a little air when the engine is hot into the intake manifold by merely turning the valve marked "Air," which results in a more complete combustion of gasoline, increased mileage and a smoother operating engine. Prompt deliveries.

Manufactured by the Hart-Bell Co., Inc., 1926 Broadway, New York City, N. Y. Price, \$6. Under the hood type, \$8.

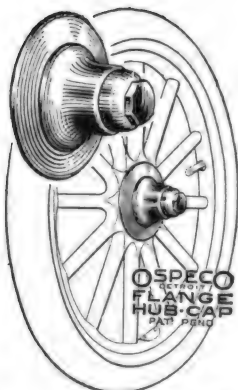
The "Safety First" Oil Signal is very simple in construction and is light and exceptionally well finished. There is nothing to get out of order and once it is properly installed it requires no attention. The principle is simple. As soon as the oil in the crank case gets low—within about 20 miles run of the danger point—a contact is formed at a given point, causing a light to flash, which is located on the dash in plain sight of the driver. The light will then burn con-



stantly until the oil supply is replenished, which will automatically break the contact and the light goes out and remains out until the oil again gets low. Prompt deliveries.

Manufactured by "Go" Motor Speeder Co., Three Rivers, Mich. Price, \$4.50.

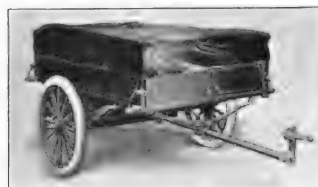
The Ospeco Flange Hub Cap is designed to replace the original Ford hub cap. They are rugged and distinctive in design and add materially to the appearance of the car. They are easily installed by merely screwing them on just like the old hub caps. Prompt deliveries.



Manufactured by the Michigan Auto Products Co., Detroit, Mich., and Cincinnati, O. Price, \$5 per set of four.

The Auto-Kamp Trailer enables one to live out of doors. It is a trailer to be drawn behind the car and when extended is a fully equipped home wherever one happens to be. It is a sleeping tent with two comfortable double beds, with real sagless springs, mattresses and bedding. It also has an ice box, two-burner gasoline stove, electric light outfit and table. The tent is water proof, wind proof and insect proof. It all folds compactly when on the road, under a dust proof, close fitting tarpaulin. It can be set up in seven

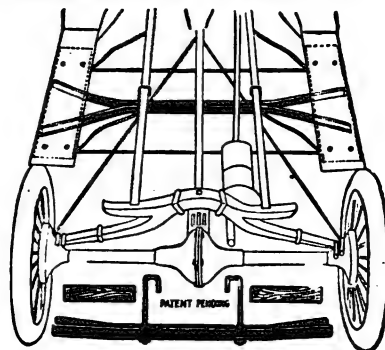
minutes by one man alone. There are no bolts, nuts or clamps. The beds simply fold over on strong hinges. The tent frame is put in sockets, the bed legs are hinged and the whole is securely braced, being firm and rigid when in place. It attaches by universal socket and follows



behind the car at any speed, over any kind of a road easily and silently. Prompt deliveries.

Manufactured by the Auto-Kamp Equipment Co., Inc., Saginaw, Mich. Price complete with full equipment and solid tires, \$235. With pneumatic tires, \$250.

The Presto Body Brace is designed to support the running boards on the Ford car. It is made up of two pieces of channel iron placed back to back, securely riveted together with a spacer between them. The channel irons are separated slightly by the spacer, which allows room for two bolts, which are formed into a hook at the top. These are hooked over the main frame work of the Ford chassis and the ends of the channel iron project out on either side under the running boards. Two extra pieces of board are furnished, which fit underneath the run-



ning boards for a distance of about 36 inches and when the nuts on the bolts which hook over the frame are tightened this body brace forms a perfect support for the running boards and binds the frame work and body of car together, thus stopping vibration. Prompt deliveries.

Manufactured by the Metal Specialties Manufacturing Co., Chicago, Ill. Price, \$3.50.



The Defender Thief Proof Ignition Lock for Fords has been patented in the United States and Canada, all claims for its special features being covered, which include the grounding device, the method for locking the casing over the Ford switch, as well as the idea of locking the coil box. The makers are in a position to make prompt deliveries and will continue to do so throughout the fall and winter.

Manufactured by the Defender Auto Lock Co., Marquette Bldg., Detroit, Mich. Write for prices and literature.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Waltham Model O Truck Clock is specified by the United States government to run war trucks on schedule time. This clock will keep accurate time all of the time because it is built to withstand



climatic conditions and the shock of travel over rough roads. It has two main springs and the radium dial and hands are plainly visible on the darkest night. It is wound only once in eight days at the flash of a red signal on the dial. The United States government, who recently purchased 10,000 trucks for military purposes, specified that they must be equipped with this model clock.

Manufactured by the Waltham Watch Co., Waltham, Mass. Write for prices and literature.

Nazette Connecting Rod Aligning Fixture is an aligning fixture for testing the alignment of new and used connecting rods for Ford engines. It is conservatively estimated that 50% of new rods are not true, and 97% of the rods in engines which have been overhauled are out of alignment. This condition invariably causing a knock which many a mechanic has looked for but could not find. The pins in the tool are made of high carbon steel, double heat treated, hardened and ground. The large pin is accurately fitted into steel bushings, which are also hardened and ground. Immediate deliveries.

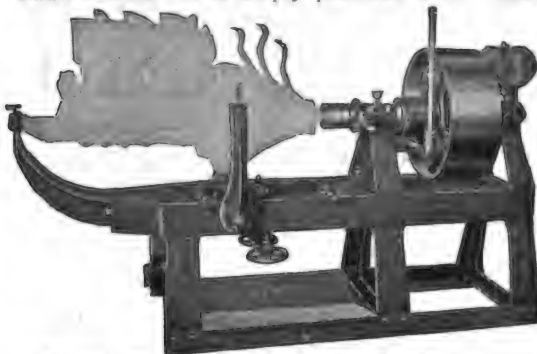
Manufactured by the Nazette Manufacturing Co., Eldora, Ia. Write for prices and literature.

The White Valve Grinder is held in place by the operator with one hand, while with the other hand he operates the slide handle, giving the grinder a reciprocating motion and gives the valve a perfect seat free from ridges. The slide

handle delivers the power over the center of the tool and there are no cranks to turn, no side gears, no bows to pull, all of which attachments for driving always serve to pull power off center of a valve. This tool is light, strong and durable and will grind the valves of any car, and in many cases will grind valves where an ordinary valve grinder cannot be used. This tool has two small attachments on the lower end for valves that are either drilled or slotted and with its swivel attachment it is easy to get at the Ford valves under the dash. Orders filled promptly.

Manufactured by the White Manufacturing Co., South Bend, Ind. Price, \$2.50.

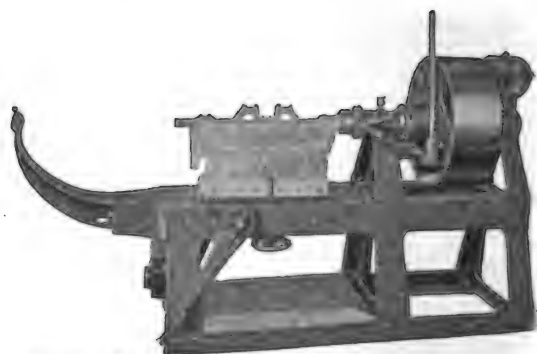
The Nazett Combination Burning-In and Work Out Machine will permit the average mechanic with a limited experience to burn-in all the main bearing and connecting rod bearings of a Ford engine in one hour's time and have a better job than could otherwise be obtained in several hours time. The machine is designed to be operated by a minimum amount of power, as most shops are equipped with small motors. It is amply provided with



Nazette Machine Working Out Motor.

adjustments, provision being made for raising and lowering the cylinder block to allow proper alignment by means of positive and quick adjusting blocks, which slide in accurately milled grooves in the main bed plate. An expanding clutch is used with hard wood friction blocks controlled with turn buckles. Bronze shoes are used in the clutch throw out collars.

To test the tightness of the bearings during the burning in operation the knurled handle clutch lever is removed from its socket and inserted in the socket



Nazette Machine Burning-In Bearings.

provided on the clutch arm, which enables the operator to turn the crankshaft by hand. It is not necessary to remove the cylinder block from the machine to tighten bearings or inspect same, as this may be done while the machine is running. Openings are provided in the main bed plate through which the valves are free to operate and permit the easy replacement of pistons. In fact it is not necessary to remove the block from the machine until it is ready to be bolted to the crank case. The heavy flywheel when under motion helps to maintain a more constant speed with a minimum amount of power.

To convert the machine into a workout machine it is simply necessary to raise the two side arms, lock them into a vertical position and place the assembled engine into position. Convenient adjustments are properly provided for to align same. It is very essential to work the engine for a short time after it has been overhauled and this test will enable the mechanic to discover such defects as piston slaps, noisy timing gears and oil leaks. The machine is provided with brackets to attach the regular Ford coil box. A gasoline tank is equipped to connect the carburetor. Prompt deliveries.

Manufactured by the Nazette Manufacturing Co., Eldora, Ia. Write for prices and literature.

Genolite (standard six volt system) gives the Ford a constant and sure head and tail lights while running or idle. This system is easily installed as no machine work is involved. It is operated by a patented flat belt, positive and guaranteed generator drive with minimum wear. The lighting switch is conveniently located on the steering post with two positions—full touring and dim. This system can do double duty. In addition to furnishing lights it will give you ignition for your engine, two sources of current always available—one battery and one generator. Prompt deliveries.

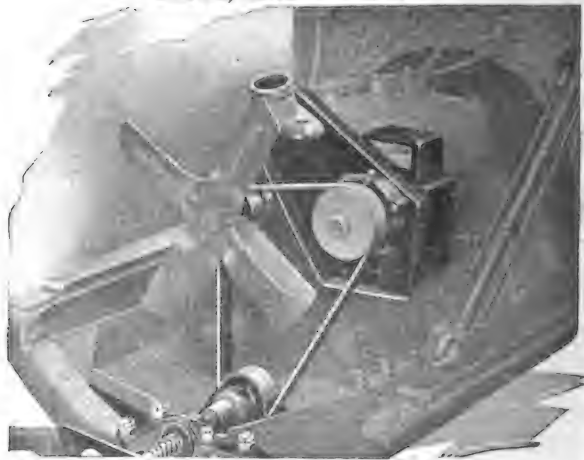
Distributed by automobile division, Pettigell-Andrews Co., 100 Brookline Ave., Boston, Mass. Price, \$50.



Nazette Connecting Rod Aligning Fixture.



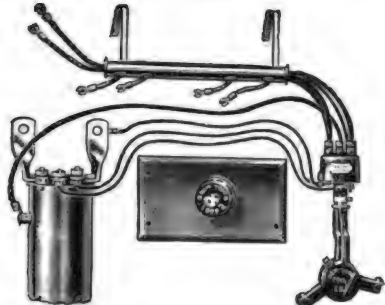
White Valve Grinder.



Genolite Lighting System for Fords.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

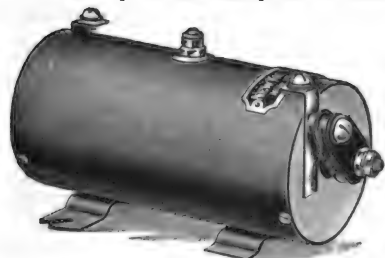
The Vibrator-less Coil Ignition System for Ford cars consists of a timer distributor unit, which is designed for mounting on the front of the engine and driven from the present camshaft projection. The distributor unit is similar to the conventional high-tension distributor, while the timer, or breaker box, is so arranged that with every break in the circuit a shower of sparks is produced by the coil, which is mounted on the engine. Current for the system is taken from the Ford magneto, and such is the construction of the breaker box that the "dead" points of generation in the magneto do not effect



its working. This system is said to work equally well either on dry cells or storage battery.

Manufactured by New York Coil Co., 338 Pearl St., New York, N. Y. Price complete, \$22.

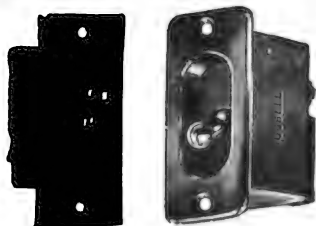
The New York Transformer Coil is interchangeable with any supplied on all modern battery ignition systems. They produce a hot flame at all engine speeds on a minimum amount of battery energy. Operating on very low voltage they mean getting away from starting troubles that have been attributed in many cases to the inability of coils to supply a sufficiently powerful spark at the instant of starting, as at this time the starting motor's drain on the battery is so heavy as to reduce



the voltage in many instances to four volts or less. The condenser is of the proper construction to insure long life of contact points in the distributor.

Manufactured by the New York Coil Co., New York, N. Y. List price on all models \$9 each.

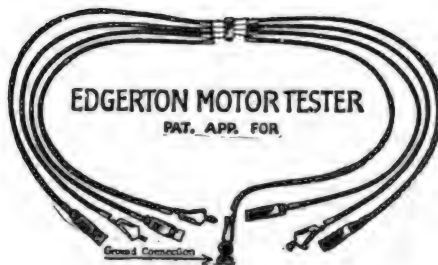
The Hubbell Toggle Switch is quick to work, slow to wear and drops instantly into place and will quickly break the con-



nection with a flip of the lever. It is easily installed upon the dash and requires no complicated movement of the fingers to send it into action. With the handle up the current is on and with the handle down the current is off, making the switch fool proof. All types are made, meeting the regular standard and special switch requirements. Can meet demands for delivery.

Manufactured by the Harvey Hubbell Co., Inc., Bridgeport, Conn. Write for prices.

The Edgerton Motor Tester is for use in determining if all the cylinders of an engine are working properly and are each furnishing an equal amount of power. It



consists of a number of secondary wires which are connected by special easily attached clips with the spark plugs of all but one cylinder. Another wire from the tester is grounded to the engine base, thereby cutting out all but one cylinder. It is then an easy matter to find whether that particular cylinder is running smoothly. By altering the wire arrangement each cylinder may be tested in turn. Jobbers and dealers can obtain prompt deliveries.

Manufactured by R. G. Edgerton & Co., Suffolk, Va. Prices ranging from \$2 to \$9.50 according to number of cylinders and type of tester.

The B-W Ammeter has a case of drawn brass finished in either bright nickel or black rubberoid. It is supplied in either surface or flush types. The glass is held



in place with a special baked cement, which makes it waterproof, and is further reinforced with a wire locking ring, which eliminates any chance of the glass working loose. The movement is said to be practically vibrationless, that is, not affected by engine or rough road jars. It is of the permanent magnet iron vane type and is not affected by short circuits. The scale is of the usual etched type and several different finishes are optional.

Manufactured by Ballman-Whitten Manufacturing Co., 4060 Forest Park Blvd., St. Louis, Mo. Write for prices.

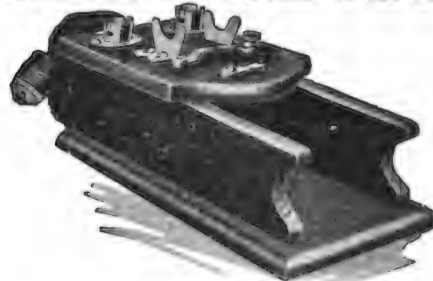
The B-W Magneto Tester makes it possible to test Ford magnetos without removing the magneto from the engine and it constantly checks up and indicates any trouble. The tester consists of a reactance coil and an alternating current ammeter, all mounted in a neat wooden case. The scale of the tester is calibrated to



show the proper strength of Ford magneto upon any model. The tester serves its greatest purpose when the engine is on the bench. It enables one to get the magneto perfect before reassembling the engine in the chassis. This is done by grounding one of the leads of the tester to the engine and holding the other lead to the contact of the coil frame with the fingers. The other hand revolves the fly-wheel. This can be done fast enough so that the tester will give a steady, accurate reading. Other tests can be made quickly and accurately by running the engine at any moderate speed, without disassembling, and the tester will indicate the exact condition of the magneto.

Manufactured by the Ballman-Whitten Manufacturing Co., 4060 Forest Park Blvd., St. Louis, Mo. Price, \$10. Substantial discount to dealers.

The Jefferson Ford Unit and Combination Tester is designed to facilitate the testing of the Ford coil unit. Speed and accuracy in testing the coils makes the device handy, for in addition to the coil



testing device the tester is fitted with equipment for the testing of automobile lamps, regardless of voltage or candle power, spark plugs of any type, electric horns, signals, coils, etc.

The device is made in two types, the first, No. 28, is designed for connection with the regular alternating current lighting circuit and can be furnished to connect to any commercial voltage or cycle. This voltage is reduced to 12 by the combination tester, which is the minimum voltage generated by the Ford magneto.

The second type, No. 30, is of practically the same type of construction, but designed for operation on a six-volt storage battery or four dry cells.

The top of the unit is fitted with both a single and double contact lamp socket for testing light globes; a flexible spark plug testing rack; an adjustable spark gap and a contact button. Upon the end of the device are mounted two terminals, to which may be connected leads for general circuit testing and trouble finding.

Manufactured by Jefferson Electric Manufacturing Co., 426-430 South Green St., Chicago, Ill. Price for No. 28, \$6; for No. 30, \$6.

A Double Outlet Y Plug Socket has recently been placed upon the market. Unlike the straight plug socket this plug is made in the Y shape, converting a single



outlet into a double socket. By its use the owner converts his single dash lamp for two purposes at the same time, for one side of the plug may be used for spot light and the other side for an inspection lamp, regular dash lamp or cigar lighter. It has a standard Edison type plug connection at one end, which can be plugged into any dash lamp socket and is neat appearing with the exposed parts nickel plated. It is made in double contact, single or double to single contact.

Manufactured by the Metal Specialties Manufacturing Co., Chicago, Ill. Write for prices.

The Shaler Roadlighter, in the opinion of motorists who have used it, does not owe its value so much to the fact of its compliance with anti-glare laws as to the fact that with it they can drive without annoyance or danger from the blinding headlights they always meet on night trips.

Roadlighters take the waste portion of the light, which ordinarily shoots upward above the headlights, and concentrates it on the edge of the road. The effect is the same as using a spotlight on each side of the car in addition to the usual penetrating beam from the head lamps. With this sort of illumination one can see the road right through the glare of headlights he meets and turn out to pass with the same confidence he would in the day time.

While the Roadlighter is approved in every state where approval is required, it is not merely a means of complying with the law, but a protection against drivers

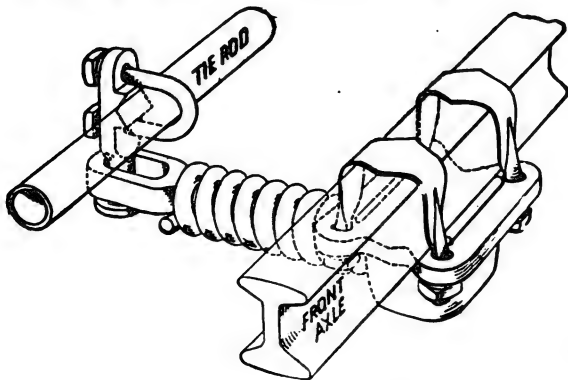


who ignore the law. No glare is produced even when the largest bulbs are used. The road is illuminated from fence to fence. The distance light is intensified. Fog penetration is secured without discoloration of light.

Recent tests under the New York state law permit Roadlighter to be used with maximum candlepower bulbs permitted by the law, which are of 24 candlepower. Texas tests, where no maximum is specified by law, permit 40 candlepower bulbs to be used with the Roadlighter, and these lamps are the largest commercially available. Orders for Shaler Roadlighters are being filled promptly.

Manufactured by the C. A. Shaler Co., Waukegan, Wis. Prices, Ford size and smaller, \$2.75; larger sizes, \$3.50.

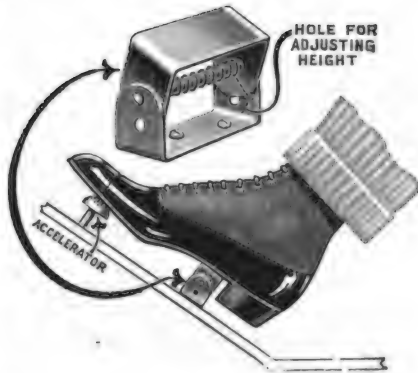
The D. & O. Anti-Wobbler is a simple, substantial device for preventing the wiggle and jiggle of the Ford steering wheels. It is easily attached to the center of the front axle in a few minutes and the makers claim it to eliminate driving



accidents by holding the front wheels true at all times, thus preventing loss of control.

The G. H. Dyer Co., Cambridge, Mass. Write for price and literature.

The New York Foot Supporter was designed to overcome the great amount of leg and muscle strain in operating the accelerator over rough roads, for every



jar or jolt is transmitted through the foot and has its effect upon the action of the engine. As the illustration shows it is attached to the footboard in such a manner as to support the weight of the foot upon an adjustable hinge. Two screws secure the device and once installed the position is always correct.

Manufactured by New York Coil Co., 338 Pearl St., New York City, N. Y. Write for prices.

Dutch Brand "2 in 1" Tread Filler, is a liquid rubber that is injected in tread cuts, bruises or gashes in tires, and which closes them against the action of the elements and to oil, sand and other foreign matter that tend to enlarge the wounds and cause the fabric to rot. It requires but a moment to apply the filler and no cement is needed. It meets the demand of the times for tire conservation



by supplying a means of quickly and easily repairing all cuts and injuries immediately, and permitting them to give service throughout their allotted mileage. It is put up in 1x6 inch collapsible tubes, packed one dozen in a box—the container being designed for counter display.

Manufactured by Van Cleef Bros., Chicago, Ill. Price, 35 cents a tube.

The Harlem Single Action Tire Pump is designed to offer a natural pumping angle and has a sufficiently large base to prevent it from sinking into the sand or mud when operated. The cylinder is made of a heavy gauge 1 1/4 x 22 steel tube and this is screwed into a special collapsible cast base. The plunger rod is extra heavy and is fitted with a selected Kip cup at the lower end. The handle is re-



inforced and extra large. It is finished in black enamel and nickel.

Manufactured by the Judd & Leland Manufacturing Co., Clifton Springs, N. Y. Price, \$2.75.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

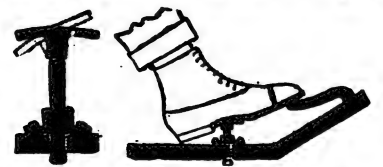
The Inland Piston Ring is of the concentric type with the cut extending half way around its circumference, which feature equalizes the radial pressure of the ring against the cylinder wall and at the same time prevents any leakage through the cut in the ring. The cut is made at a very acute angle with the circumference and is entirely closed. There is a small slot in the ring at each end of the cut, located diametrically opposite to each other. With this arrangement only a small amount of gas will enter the slot and pass under the ring, but it cannot escape from the ring groove, because at the point where the bottom slot on the ring is located the piston bears firmly against the cylinder wall and every possible passage is closed to the gas. This patented design of the Inland gives it greater strength and wearing qualities and it is claimed that it will wear into a cylinder in a few



revolutions of the motor, showing perfect contact and equal wear at all points. Deliveries can be made promptly and in any quantity.

Manufactured by the Inland Machine Works, St. Louis, Mo. Prices \$1.25 to \$1.75 on sizes from 2 inches to 5 1/2 inches. On six-inch sizes and over list will be furnished upon request.

The Adjustable Accelerator Foot Rest fastens to the floor or footboard of the car and serves as a support for the foot in the operation of the throttle or accelerator pedal, enabling the operator to maintain constant and even pressure. It serves as a guide to the foot in reaching



for the accelerator pedal and incidentally relieves the strain on the muscles of the leg which otherwise would have to be kept under tension.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Price \$1.50.

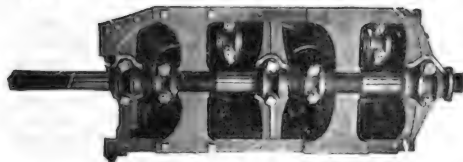
Rico Ford Pedal Covers are made of live pliable rubber and are attached to a metal plate having eight prongs, which can be bent around the pedal with the



fingers. This fastening is rigid and will not work loose. No tools are required in fitting the covers as there are no holes to be drilled or bolts used. These covers fit all Ford models.

Manufactured by the Rich Manufacturing Co., 1777 Broadway, New York City. Price, per set of three, 75 cents.

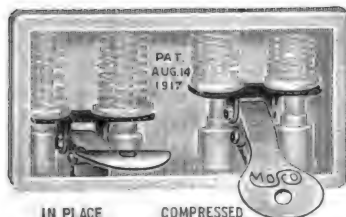
The Dyer Bearing Reamer greatly facilitates the work of fitting main and connecting rod bearings of a Ford engine. The tool leaves a smooth, glassy finish to the bearing surface. The reamer has leads of .004 of an inch at the end of each fluke and is held in line by two adjustable



bearings, which are bolted to the crank case while it is being used. It can be seen from the illustration that by the employment of this tool the lining up of all the bearings is fully assured. Deliveries in one week up to 12 reamers.

Manufactured by the G. H. Dyer Co., Cambridge, Mass.

The Mosco Valve Spring Compressor for Fords eliminates what is usually a troublesome operation, viz., the compressing and removing of valve springs. By using this simple device springs can remain in position until the grinding of the valve is completed. The compressor is placed in position as shown in the left of cut, pushing it back against the cylinder wall, making sure that the tongue which hangs down is over the edge and resting in the channel, then the handle is pushed down as far as it will go. This opera-



tion compresses two valve springs at one time and permits removal of the pins. If the pins are crosswise the valve is turned until they are in the proper position to pass through the slots in compressor. After the valves are ground the operation is reversed. The compressor is made of heavy pressed steel. Immediate deliveries from stock.

Manufactured by the Motor Specialties Co., Waltham, Mass. Price, 50c.

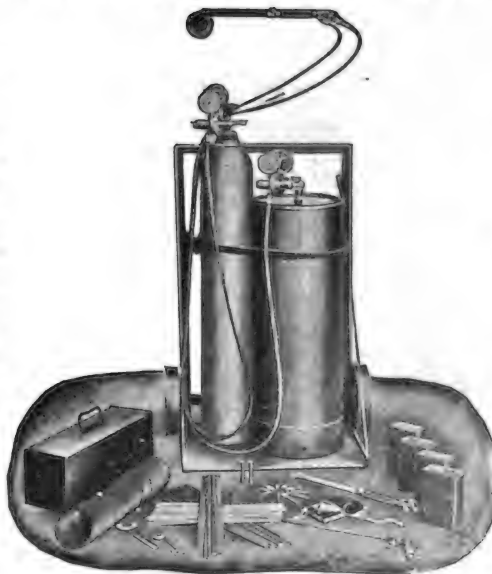
The Socket Wrench Set No. 489, herewith illustrated, consists of a ratchet socket wrench with a 3/4-inch hexagon socket (which may be obtained separately) and four extra sockets fitting it. These extra sockets have 5/8, 11/16, 13/16 and 7/8-inch hexagon openings. The ratchet socket wrench has a seven-inch black enameled iron handle and a very strong ratchet that can be used for either right or left hand work. The lignumvitae head runs on ball bearings. Each set is



packed in a strong and attractive hard wood box.

Manufactured by Goodell-Pratt Co., Greenfield, Mass. Price of set, \$5. Price of socket wrench No 419 with 3/4-inch hexagon socket, \$2.50.

The Dyer Welding, Cutting and Carbon Removing Outfit has two utilities included, that of welding and cutting by the oxy-acetylene process and of removing carbon from the combustion chambers and cylinders of engines. With this apparatus the garage man and repair man can quickly and satisfactorily do all kinds of brazing, welding of broken parts, frame straightening and many other things requiring the use of a welding outfit. The material used in this outfit is of the highest grade. The regulators are strongly built and accurate. The Dyer Co. uses the United States Gauge Co.'s gauges, and the hose used is of extra heavy five-ply fabric. The outfit includes a truck made of the best grade of boiler plate strongly welded. The torches are



simple in construction and easily handled, being of light design and highly efficient. The welding torches cannot back-fire under any circumstances and can be operated to a low enough acetylene pressure to practically empty the gas cylinders. Prompt deliveries on any of the apparatus or complete outfits.

Manufactured by the G. H. Dyer Co., Cambridge, Mass.

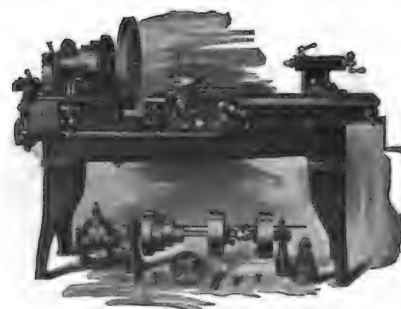
The Beardsley Double Acting Valve Lifter is a time saver, for it removes and replaces Ford valves in less than a minute and in other cars in half the time of other valve lifters. The foot of the device is simply shoved under the spring washer and the cam lever pushed down, which action holds the valve down and



lifts the spring up, giving more room to remove and replace the valves quickly. Sold under guarantee to give satisfaction. Prompt delivery.

Manufactured by the Loomis-Beardsley Co., 1112 Mt. Vernon Ave., Columbus, O. Patented. Price \$1.50.

The Sliding Extension Gap-Lathe is capable of handling a wide range of work. It is provided with six quickly changed gear feeds and an extra large spindle. All the gears are covered with safety guards. The bed of the lathe is well



braced and accurately proportioned throughout. The top sliding bed and main bed are planed full length and fitted together with dove-tail construction. A screw and crank at one end draws the bed back when it is desired to widen the gap between the centers. Fair deliveries.

Manufactured by the Barnes Drill Co., 814-30 Chestnut St., Rockford, Ill. Prices, 5 1/2 foot lathe, \$650; 7 1/2 foot, \$700 f. o. b.

The Mosco Tire Rim Tool shown in the illustration is a handy accessory for the car operator using a machine equipped with split rims. This tool is designed to be hooked over the rim. When so applied and the turnbuckle turned the rim is opened, making the replacement of a tire an easy matter. This tool may also be used for expanding the rim after the tire is applied by reversing the process, the untwisting of the turn buckle exerting sufficient pressure upon the rim to expand it. Reasonable deliveries.

Manufactured by the Mosco Specialties Co., Waltham, Mass. Price, \$3.



Permatex Heat Resisting Gasket Cement is an extra heavy preparation compounded for use on cylinder heads, carburetors, manifolds, crank cases, gear cases, spark plugs and pump gaskets. It has no harmful action on cardboard, paper, leather, rubber or asbestos or metal, and it is impervious to gasoline, kerosene, oil and water. It is applied in a thin coat to both sides of the gasket just before the gasket is put into place. Prompt deliveries are assured for the next 12 months.

Prepared by Constant A. Benoit, Brooklyn, N. Y.

New Literature on Gasoline Hose. The bureau of standards, Department of Commerce, U. S. government, in a recent report comments on the leaks in valves and piping used for conveying gasoline. Of special interest in this connection is the illustrated literature just issued, for free distribution, by Metal Hose and Tubing Co., Brooklyn, N. Y.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

Dual Cooling System for Ford Cars consists of a centrifugal force circulating pump with a capacity that will not allow the water to remain in the cylinder block long enough to come to the boiling point, also a large ball bearing fan that supplies enough air to carry away the heat



from the radiator. The pump swings on the water line, which gives a proper adjustment to both the fan and the pump belt at all times. There being separate adjustments for each, which are automatically taken up by the spring belt tighteners, and when further belt adjustments are necessary this can be done without the use of a wrench. Prompt deliveries.

Manufactured by the Dual Manufacturing Co., 1202 Hennepin Ave., Minneapolis, Minn. Price, \$25.

Union Tool Chests enable the mechanic to keep his tools for instant use in having them always at hand filed according to their adaptability to the job on hand. The cabinet is made in various types and the handle is covered with heavy, genuine leather and has heavy steel wire through the center. Loops secured by rivets carry the weight and cover the ends of the handle which is attached to the chest with heavy cotter pins, absolutely preventing its being pulled out of the loops. The frame is thoroughly seasoned, properly kiln dried selected stock, quartered white oak in quartered oak chests. Plain



oak in G chests and basswood for covered chests. The drawer sides are of cherry or maple. The fronts of oak and mahogany. The bottoms of three-ply veneer. The hardware is extra heavy, with polished nickel finish. The lock of Sargent & Greenleaf with 100 key changes, of solid brass and bronze, with two milled slot, flat, rust proof keys. Fair deliveries.

Manufactured by the Union Tool Chest Works, Rochester, N. Y. Price, \$17.50.

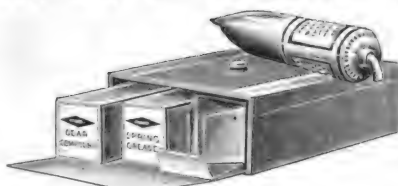
The Weaver Auto Hoist has a much greater range of application than the ordinary block and tackle. It can be run into position over a car in a crowded shop without requiring more than 12 to 14 inches space on either side of the car. The frame is so designed as to permit the height of the arch to be increased approximately 12 inches, allowing the uprights to be raised to the desired height in the braces on either side by means of the



chain hoist. The increased height enables the hoist to raise the rear end of a limousine or a touring car with the top up, for removing the rear system. One chain of the hoist may be carried over the pulley in the center of the frame for performing work which can be handled to better advantage by a single suspension than by a double suspension from each corner of the frame, as shown in the illustration. The hoisting mechanism is operated by worm drive, which is absolutely safe and positive. There are no gears or ratchets to slip or break and allow the load to fall.

Manufactured by the Weaver Manufacturing Co., Springfield, Ill. Write for prices and literature.

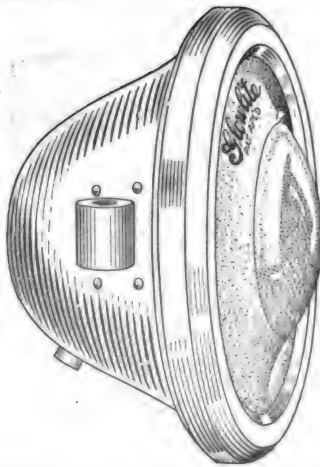
Grease-in-Tubes is the clean, handy, ready way to use grease. It is economical, as there is no waste—fresh grease always being ready and usable to the



last drop. This grease is put up in three tubes in a carton called "The Lincoln Highway Kit" and consists of one tube of cup grease, one tube of spring grease and one tube of gear compound. This grease is of the best grades obtainable and is always ready for instant use without the usual soiling of hands and clothing in inserting it.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Price, \$1 a kit; 35 cents a tube.

The Glowlite Lenses, the manufacturers claim, are the highest scientific application of the safety idea in automobile headlighting. There is no concentration of light in spots or patches upon the road bed traversed. The distribution of light



to the sides of the car, even almost directly at right angles to the plane of the lamps, is decidedly more uniform and more powerful than is the usual type of

(When Writing to Advertisers, Please Mention The Automobile Journal.)

headlight. This is an important advantage, since it permits the driver to see ruts, rocks, ditches, etc., very clearly, as well as enabling him to read direction signs and mile posts along the road.

Manufactured by the Glowlite Co., Columbus, O. Price \$2 per pair, any size.

Pontoklene is a product of the well known Du Pont Chemical Works and is used for removing grease, oil or tar from the motor car, while at the same time restoring the original polish of the car without rubbing. It is also used for cleaning engines and is superior to gasoline

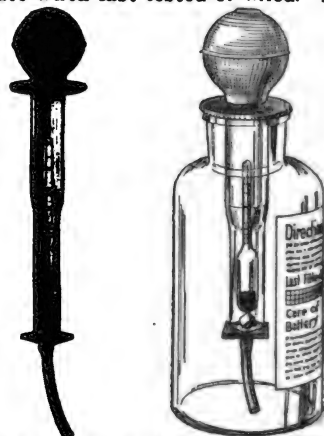


for that purpose. In cleaning the automobile Pontoklene will save much time and labor, particularly where many cars are handled, as it will remove tar as readily as water washes away dust without injuring the finish of the body.

Distributed by E. I. Du Pont De Nemours & Co., Wilmington, Del. Prices: 1/4 gallon, \$1; 1/2 gallon, \$1.50.

The WorkRite Hydrometer Outfit consists of a high grade hydrometer fitted in a glass jar for holding distilled water or pure rain water. It can readily be seen that this outfit would be very handy for use around either a public or private garage, for filling and testing storage batteries.

The WorkRite hydrometer is fitted with rubber collars at each end, which prevent the glass from striking and breaking if accidentally dropped. The large collar at top acts as a cover for the water jar and the square collar at bottom prevents the instrument from rolling if placed on an uneven surface. The label on bottle contains numerous blank spaces for filling in the date when last tested or filled. It also



contains complete instructions for the care of the battery in both winter and summer. Immediate deliveries.

Manufactured by the WorkRite Manufacturing Co., Cleveland, O. Prices for the combination outfit is \$1.50, and for the hydrometer only \$1.

Waxit is a cream white emulsion for cleaning and polishing all varnished and enameled highly finished surfaces. It is not a varnish solvent and if spilled on varnished surfaces can be wiped up without injury to same. Contains no injurious or inflammable ingredients and will not injure the hands. It is applied to an automobile with a piece of clean cloth or cotton waste just as one would apply soap and water, after which it is carefully wiped off with a piece of dry cheese cloth, leaving a smooth, dry polish, to which the dust will not adhere.

Manufactured by the Waxit Manufacturing Co., 2424-26-28 University Ave., S. E., Minneapolis, Minn.

The Fawcett Combination Wrench is a combination gasoline gauge, oil cock wrench and cleaner, and the claim is made that it will not only measure the gasoline in the tank, but provide the only sure means of learning whether there is oil in the crank case, as the pin will prove if the oil cock is stopped up or the oil ex-



hausted. It is made of nickel plated, coppered, Bessemer steel rod, with a very high class finish. They are put up in complete packages for the convenience of the trade and dealers are furnished with a very handsome counter display card, upon which is mounted one of the tools, which helps considerably in their sale. Prompt deliveries.

Manufactured by J. H. Faw, Inc., 37 Warren St., New York City. Retail price 45 cents.

The Utility Universal Rim Wrench is light, compact and fits easily into the tool box without folding. The brace is nickel plated, the tube contains jaws fin-



ished in black enamel and the handle corresponds.

Manufactured by the Hill Pump Valve Co., Chicago, Ill. Price, \$1.75.

The No. 5 Marvel Reboring Machine is practically automatic in all its working parts. After the cylinder is centered on the face plate the automatic feed release can be set to the cylinder depth and the operator can perform other work while the machine is reboring.

With the present shortage of man power this labor saving machine is meeting with a big demand and the manufacturers state that in order to obtain



prompt deliveries orders should be booked at once.

Manufactured by the Marvel Machinery Co., 1301-1307 South Third St., Minneapolis, Minn. Write for prices and descriptive literature.

The Storm Piston Vise for 3 1/4-inch (Ford size) pistons, holds the piston firmly and in a convenient position for

working. The old method of handling a piston in a common vise has been largely by gripping the connecting rod with the piston attached. Any attempt to grip the piston itself would not only injure the machined surface, but also press it out of round. Therefore the ordinary bench vise is poorly adapted for piston work. It is injurious to the connecting rod, for stress is applied upon it when tightening the wrist pin bolts, which results in distortion of twist with considerable faults in alignment. But more than that it is inconvenient, awkward and interferes with other work at bench.

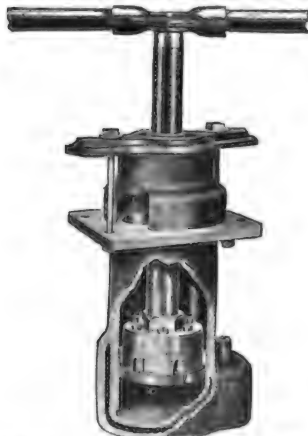


This new Storm Vise grips the piston as it should. Its jaws conform to the shape of the piston and fits it. They are lined with a soft metal and prevent damage to both the piston and the rod. The piston is quickly clamped or released by a single turn of the hand. Quick adjustment is provided for different oversizes. The piston is gripped firmly and cannot be dislodged by the effort employed with the wrench or other tools.

Manufactured by the Storm Manufacturing Co., Thompson, Ia. Price, \$10.

The Storm Reboring Machine herewith illustrated is made in various capacities. They are portable machines, suitable for the average garage and repair shop conditions. They are comparatively low in cost, easily operated by men of little shop experience. They are filling a long felt want for a reliable tool for renewing worn and scored cylinders without loss of time and without the necessity of sending them away.

The machines are provided with main cutter heads, each provided with six cutter blades. A single cutter adjuster operates the blades, which may be set to cut any desired oversize and to fit pistons already furnished. The head is fed gradually to the work and is provided with upper and lower supports, which also center the machine. It is adapted for hand operation. A convenient case is provided for storing same when not in use.



Manufactured by Storm Manufacturing Co., Thompson, Ia. Prices: No. 214, standard large machine, 2 1/2 to 5 inches, \$115; No. 212, standard machine, 3 11/16 to 5 inches, \$80; No. 213, attachment for No. 212, 2 1/2 to 5 11/16, \$36; No. 204, machine for Ford, \$55; No. 206, machine for Ford and Dodge, \$60; No. 210, drill press attachments, extra, with straight shank, \$7.30; No. 211, drill press attachments, extra, with taper shank, \$8.

The Storm Valve Port Renewing Outfit accomplishes three important things: It enlarges the port, forms a new narrow seat similar to that on a new motor, and produces a new stem guide which, when fitted with valves with 1/64 inch over-

size stems makes the entire valve system as good or, in fact, better than on the day it left the factory new.

An upper jig or guide is provided. Emphasis is laid upon this feature, as it is the only way absolute accuracy can be obtained. This jig is secured to the engine block by two bolts which fit into the cylinder head bolt holes and it remains in position until all operations have been completed. Then it is swung to the next post by removing one bolt.

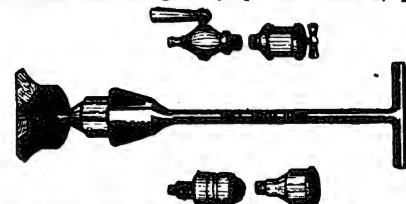
With the Storm device an enlarging reamer cuts away a portion of the old seat, enabling the reseating reamer, which is next used, to cut a new narrow seat. The enlarged port is in itself a good feature, allowing a more free passage of the gases, promotes cooling, permits a somewhat higher speed and greater power. The reseating is accomplished



in practically the same manner as other tools for this purpose, excepting that the upper jig insures absolute accuracy, whereas without this support the reamer is allowed to vary or wobble, due to the unavoidably uneven pressure exerted by the operator, necessitating a much greater amount of grinding to true up.

Manufactured by Storm Manufacturing Co., Thompson, Ia. Net price complete \$15.

The Universal Grease Cup Wrench is designed to save time, labor and temper. It fits all sizes and types of grease cups without adjustment. It may also be used for other work about the car, such as turning hot or greasy primer cocks, pet

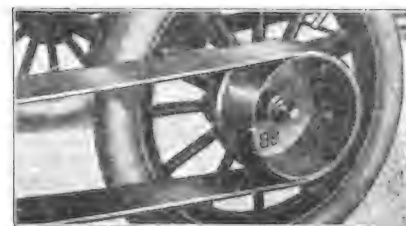


cocks or drain cocks, and it will be found especially convenient for reaching cups and cocks in out of the way places. Immediate delivery is assured.

Manufactured by the Prismolite Co., Columbus, O. Price 75 cents.

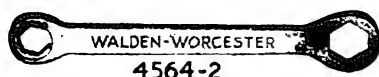
The Bayne "BB" Auto Power Pulley is an ordinary five-inch crown face belt pulley 10 inches in diameter, correctly designed, so that it can be attached to either rear wheel of an automobile by simply unscrewing and replacing the hub cap, and when attached is a perfect belt pulley for transmitting power to any belt driven machinery. Prompt deliveries.

Manufactured by the Bayne Manufacturing Co., Bushnell, Ill. Price, \$5.65.



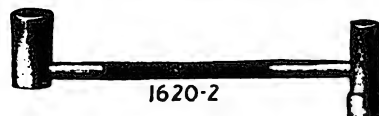
(When Writing to Advertisers, Please Mention The Automobile Journal.)

Walden-Worcester Special Wrenches for Ford Cars have been tried out by garage repair men and Ford owners. They have been found to be most efficient tools—especially useful in getting at nuts and bolts inaccessible to ordinary open-end or monkey wrenches.



4564-2

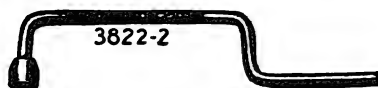
The ratchet wrench, No. 4564-2 with an 11/16 inch hexagonal opening, was particularly designed for use on transmission bands (brake and reverse), Ford car. The opposite end, 15/16 inch, is for use on Champion X spark plugs and slow speed connecting lock. This is a combination tool which has been found to be most serviceable. The price of this tool is \$1.20.



1620-2

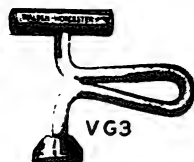
The Triple Socket Wrench, No. 1620-2, is really three wrenches in one. The socket sizes are 3/4 inch and 1 1/4 inch hexagon and 9/16 inch square. This is our new improved "Tomahawk" wrench.

The double-end socket has been designed particularly for clearance around cylinder head bolts and other places. Used on cylinder head, brake and reverse support, cylinder inlet and outlet connections, differential case, drive shaft roller bearing, front spring tie, spring, run board fender, rear axle housing, crank case (lower cover), controller shaft bracket and 9/16 square socket on main bearing bolt head. The price of this tool is 75 cents.



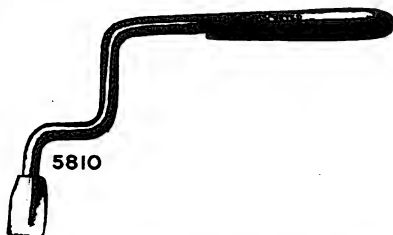
3822-2

The special type wire handle wrench, No. 3822-2, is used on flywheel cap screws. Ford car; heretofore considered an impossible place for a socket wrench. It is an ugly place for a socket wrench. It is an ugly place made easily accessible. The socket size is 11/16 inch hexagon. It sells for 50 cents.



VG3

The all-steel wire handle valve grinder No. VG3 has a 3/4 inch bar handle, which swivels on a cone bearing. The socket is shaped to fit valve heads and is fitted with hardened steel pins. The valve grinder sells for 50 cents.



5810

Wrench No. 5810 is a specially designed connecting rod wrench. It fits all connecting rods on a Ford car, including the fourth connection. This is the original design, the first wrench made to reach the fourth connection without removing the engine from the car. It sells for 50 cents.

Manufactured by the Walden-Worcester, Inc., Worcester, Mass. Write for catalogue.

The Savidge Universal Bench Valve Lathe is designed to reduce the time of fitting valves to a minimum. The tool consists essentially of a base to clamp in a vise on which is a stem way for the valve, and mounted above this is a high speed steel cutter that may be set for any



desired angle. The valve is placed in the way with a spring to maintain its position, and a handle is clamped to the stem end and turned. The cutter and the valve are adjusted by feed screws, and any cut can be had with surprising little labor, while the work is absolutely accurate. The tool can be used for any valve with 30 or 45 degrees angle faces up to 2 1/2 inches diameter and 7/16 inch stems.



The Savidge Junior Valve Lathe is intended for use with valves for Ford chassis, having 5/16 inch stems and cast iron valve heads, up to 1 1/4 inches diameter and with faces 45 degrees angle. Statement is made that this can be operated while held in the hand or clamped in a vise. The operation is practically the same as the Universal tool, but the cutter is fixed and is not fed for the cut. The adjustments are equally accurate and the work is quite as well done. The tool is a size that it may be carried in the kit of the truck or car.

Manufactured by A. C. Savidge, Indianapolis, Ind. Prices, Universal model, \$10; Junior model, \$6; extra cutters, \$1 each.

The Dyer Towing Device is a simple arrangement for fastening to the front axle of a Ford car and making possible the towing of the car by another without the aid of a second driver. The device is designed for attachment to the axle and is fitted with a clamp, which is fastened to the steering spindle connecting rod. The other end of the device is fastened to the towing car. When a corner is turned the rear car is automatical-

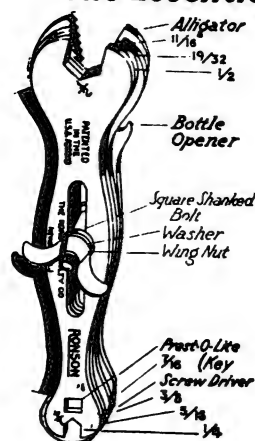


ly steered by the device. Prompt deliveries can be made in large quantities.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Write for prices and literature.

The Ronson Wrench combines eight size wrenches in one. A twist of the lock nut releases the size wanted. In addition to these wrenches, a screw driver, a bottle opener and an alligator jaw wrench are contained in the combination. The whole outfit weighs but half a pound, is

The Essential Tool™

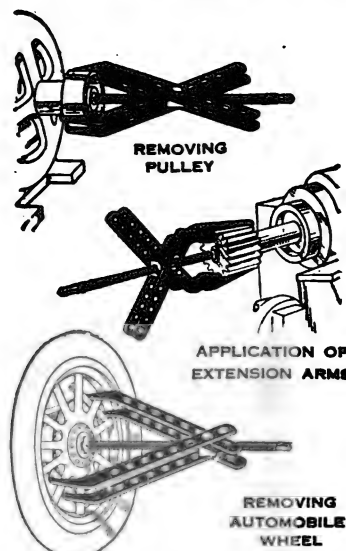


six inches long and 1/2 inch thick and may be carried in the pocket. Prompt deliveries.

Manufactured by the Art Metal Works, 7 Mulberry St., Newark, N. J. Price, \$6.00 dozen. Gross lots (minimum), \$66 gross net.

The "Little Giant" Gear and Wheel Puller is made with four puller arms of drop forged steel and has an adjustment range from nothing to 13 inches when "extension arms" are used. The puller arms are so arranged that with the draw screw in place there are four pulling points, so distributed that there is no need for a holding or steadying bar. The puller prongs are designed to give maximum strength, yet to occupy little room. For this reason they may be used for removing timing gears or other gears where room is limited.

This device is handy in removing inside work and for inside pulls. For removing small pulleys or gears a pair of extension arms may be used. These arms are provided with a locking arrangement for fastening to the pulling arms and provide for two pulling points rather



than the four as in the primal attachment. Prompt deliveries are assured.

Manufactured by Premier Electric Co., 4032 Ravenswood Ave., Chicago, Ill. Price for "Little Giant," \$10. Extension arms, \$1 extra.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

JOHNNY AITKEN, RACING PILOT, A VICTIM OF THE INFLUENZA.

The recent death of Johnny Aitken, automobile racer, at Indianapolis, was a shock to that part of the public that has followed automobile speed events. Aitken was a victim of Spanish influenza, and at the time of his fatal illness was in charge of the shop of the Allison Experimental Co. at Indianapolis. He had not been racing for the past two years, had made good progress in the work undertaken after he left the race track, and his friends aver was in excellent position to make a big, assured place for himself in his new work when death came.

There is much comment because Aitken, known as a daredevil driver, who risked his life countless times, should have been a victim of the late epidemic.

Nineteen hundred and sixteen was Aitken's biggest racing season, though he had been a formidable contestant for championship honors before that. In 1916, however, he came very prominently to the front and ended the season a close second to Resta, who was crowned king after the racing season ended. Throughout the season the two were neck and neck for first honors, with the odds in Aitken's favor, and it is generally conceded that his driving gave him a strong hold in the championship, but accidents to Aitken gave Resta the lead which won.

NORDYKE & MARMON WIN THE LIBERTY MOTOR CONTEST.

The Nordyke & Marmon Co., Indianapolis, Ind., won the first honor pennant offered by the United States government to the concern building and shipping 12-cylinder Liberty motors the most rapidly in October. The contest began Oct. 1 and ended Oct. 31. The company made a production record of 225 per cent. of its allotted quota in October. The contests are to be continued each month. Five other firms contested during October.

The flag will be presented today at one of the Indianapolis parks. It will remain at the plant of the winner until won by another concern. Among those who are expected to attend the flag presentation are John D. Ryan, Assistant Secretary of War, and Major General W. L. Kenly, Chief of the Department of Military Aeronautics.

AMAZON RUBBER CO. IS MANUFACTURING BIG LINE.

The Amazon Rubber Co., Akron, O., through the purchase of the tire accessory business of the O'Neil Tire and Rubber Co., have greatly extended their line, which now includes the following products: "Amazon" Car Supertires; "Amazon" Ribbed Tread Supertires; "Amazon" Nonskid Tread Supertires; "Amazon" Red Supertires; "Amazon" Gray Supertires; "O'Neil" Pioneer Relliners; "O'Neil" Pioneer Wing Blowout Patches; "O'Neil" Pioneer Lace-On Boots; "O'Neil" Pioneer Cementless Patches.

Riding On Felloe Band Is Very Destructive to Band and Wheel

This warning to motorists is voiced by L. M. Baker, manager of the rim department of the Bearings Service Co. headquarters, Detroit, Mich., who directs the operation of the rim departments of 22 branches and 600 distributing stations of the Bearings Service Co. He declares that motor car drivers generally prefer to remove the easily demountable rims with a punctured tire, and if an auxiliary tire is unavailable, ride into the garage or repair station on the easily damaged felloe band when they should ride on the rim.

he says, "for I see cars being driven every day on the felloe band, and I always know what the result will inevitably be.

"The motorist cannot escape after thus using the felloe band, without sending the wheel to a wheelwright for a repair job that will last about three days, put him to the trouble of taking the wheel there and back and the expense of at least \$10—all because the motorist failed to appreciate that the felloe band should not be used to ride on. The wheelwright in most cases will have to shrink a new felloe band on the wheel, for driving on it will bend it out of shape so that it cannot be straightened successfully so as to retain the rim. In some cases such abuse will ruin the wheel and the motorist will be put to the expense of a new one.

"The flange on the felloe band, against which the inner flange of the rim rests, is what the car really rides on when the rim is removed. This is either flattened out straight or bent so that it is not repairable.

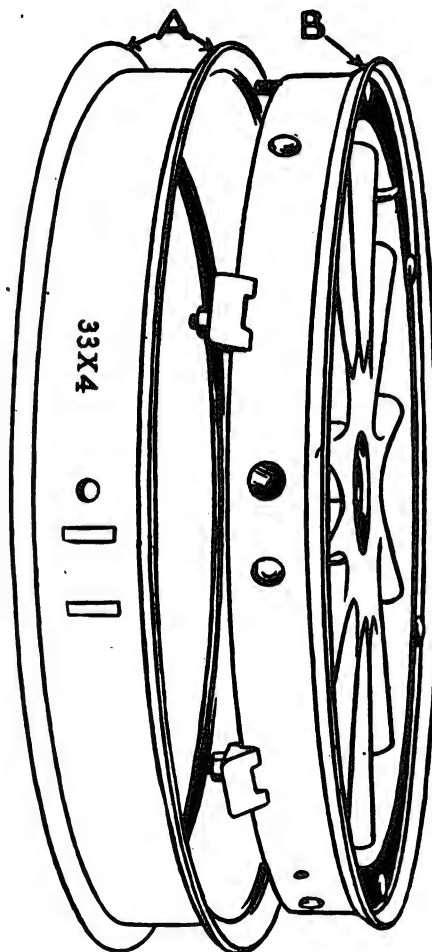
"The better thing for the motorist to do in a case where he cannot replace the tire is to replace the rim and drive to the nearest repair station. The rim has two strong flanges (designated by "A") of equal size and in 99 cases out of 100 will not be injured by such use. If the rim is injured the motorist can easily procure a new one without delay, but he will have a far harder time obtaining a felloe band. In our 22 branches the motorist or garage man can always obtain what he wants in this line or from any one of our 600 distributing stations, but there is still the delay and the expense of having it installed. To save trouble remember to put the rim back on.

CARE OF THE COOLING SYSTEM.

The average motorist spends little time in trying to maintain the running efficiency of his car. This is especially true in caring for the cooling system, which is more important than the average motorist thinks, yet it is generally neglected. If the cooling system is not kept clean and free from leaks it impedes the efficiency of the engine and increases its cost of operation.

The Northwestern Chemical Co. of Marietta, O., makers of the Norwesco line of "Chemically Correct" automotive equipment, have issued a 20-page booklet entitled "Care of the Cooling System."

This booklet is illustrated and conforms to its title, giving the motorist many practical suggestions and valuable information, which will assist him in giving proper care to the cooling system. A copy of this booklet can be secured, postpaid, by writing the Northwestern Chemical Co., Marietta, O.



Showing Construction of Wheel with Demountable Rim and Points Where Load Stresses Are Taken.

The felloe band, marked "B" in the illustration, is really nothing more than a reinforcement for the spokes and the wooden felloe which holds the spokes together, and is also a connection between the wheel and the rim, according to Mr. Baker, who says that when abused as described, it is generally damaged beyond repair. Mr. Baker, who has been in the rim business almost since the beginning of automobile rim development, says he would like to know how much wasted time and money misuse of the felloe band has cost the motorists of America—"certainly no small amount,"

American Tire Filler Industry Forms Organization

Makers Meet in Chicago to Show Need of Their Product in the Tire Conservation Movement.

The American Tire Filler Industry (Inc.) was organized as the result of a convention of representatives of the principal concerns in this country manufacturing tire filling held at the Congress Hotel, Chicago, Sept. 15-18. There are about 25 different concerns in this country producing fluid, semi-fluid or solid material for filling tubes intended for pneumatic tires, the purpose of the fluid or semi-fluid compounds being to fill punctures of tubes by exudation and retain the filling, and of the solid fillers to afford a sufficient degree of resiliency and yet be free from the delays, inconvenience and expense of tire deflation and inflation, changes and repairs.

The manufacturers of these fillers maintain that while the same ratio of resiliency obtainable with air filled tires is not realized with the use of tire filling, there is sufficient shock absorption to insure the comfort of passengers and protection of freights and to much reduce the mechanical wear from vibration. They maintain further that the insurance against tire destruction from puncture, delays, labor of changes and the reduction of repair cost compensates for any lessened comfort while riding. Statement is made that tire filling will insure a uniform degree of inflation and even wear of tires, that there is little probability of rim damage and the number of tubes required is much less than when air is the inflatant. There is less need of carrying spare casings and tubes, changes are not necessary until shoes are completely worn, and many of the accessories used with tires, such as valves, pumps, gauges, patching sleeves, jacks, etc., are not necessary for either passenger cars or trucks equipped with filled tires.

The convention held open sessions at which were present representatives of the War Department, the American Red Cross, Y. M. C. A., Salvation Army and numerous economy, labor and defense boards. The convention was opened by Franc D. Mayer of the Essenkay Products Co., Chicago, who stated among other things that very large savings could be accomplished by inflating automobile vehicle tires with resilient filler instead of air. He held that the use of filler doubled the life of tires, which meant a saving of 50 per cent. of the cost. Basing estimate on 4,000,000 passenger cars in use in the United States and assuming eight tires a year for each, 32,000,000 tires were needed annually, and at an average cost of \$20 a tire this meant \$640,000,000 spent yearly for tires for passenger cars, excluding the expense of spare tires, rims, tubes, jacks, pumps, etc. A saving of 50 per cent. would mean \$320,000,000.

He further estimated that \$260,000,000 is spent for accessories for tires, of which \$193,000,000 was for tubes alone. Adding the savings of \$320,000,000 and \$260,000,000 made a total of \$580,000,000, which he believed could be saved in very large part by the use of tire filler instead of air, basing this on 4,000,000 cars, and as a matter of fact the total number of vehicles of all kinds using pneumatic tires considerably exceeds 5,000,000.

One phase dealt with by numerous speakers, some of whom had served on the battlefields in France, was the possibility of equipping ambulances with filled tires to obviate the delays from differing damage that necessitated changes, or driving on deflated casings that was destructive of shoes, tubes and rims, increased the suffering of wounded or sick, and decidedly retarded movement of vehicles.

The conclusions of the convention may be summarized as follows with reference to the use of tire fillers:

(a) Such use reduces the likelihood of ambulances, trucks or officers' cars in the United States army service being delayed under fire or at other critical time.

(b) Such use would prevent delay of munition shipment by trucks.

(c) Such use would facilitate food production and transportation.

(d) Such use would release labor now directed to needless production, obviate waste of labor, costing in the aggregate a large amount of money, and minimize the labor necessary for repairing.

(e) Such use would greatly lessen the demand for rubber for tires and would release rubber now used for other essential requirements.

The convention believed that the government needed tire filler in every branch of its transport service, both in this country and abroad. The convention approved a resolution offering to the government the plants, products and experience of the members of the American Tire Filler Industry, Inc., in conserving life and materials now lost from tire damage or destruction.

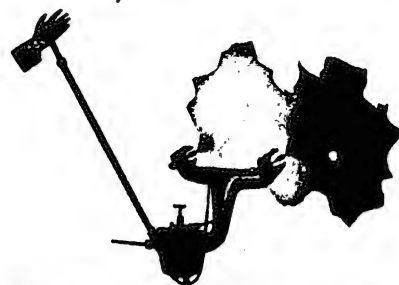
The convention elected the following officers for the coming year: President, Franc D. Mayer, Essenkay Products Co., Chicago; first vice president, Frank A. Hager, Universal Tire Filler Co., Portland, Ore.; second vice president, Lee W. Lockwood, Dahl Punctureless Filler and Rim Co., Minneapolis, Minn.; third vice president, W. W. Major, National Rubber Filler Co., Midlothian, Tex.; secretary, C. P. Umstot, Peerless Tire Filler Co., Chicago; treasurer, L. G. Harris, Wolverine Tire Cushion and Accessory Co., Detroit; directors, the officers and J. Wolff, National Synthetic Tire and Rubber Co., New York, N. Y., and C. G. Schwarz, Panama Rubber and Equipment Co., St. Louis, Mo.

LIBERTY STARTING PRIMER.

It seems an amazing fact that thousands of motorists will continue on through a winter season, cranking, adjusting and performing other unnecessary labor to start their engines while there are a number of perfectly practical devices on the market designed to

eliminate all this trouble and waste of time. The trouble with these people in coming to a realization of this fact seems to lie with their lack of knowledge concerning the carburetion of gasoline, the most important point in connection with which is that the various particles of the fuel be so broken up that they will mix readily with the air and become instantly ignitable. This latter condition is quickly established by high temperatures, but these are obtainable or exist only after the motor has started and before that time, particularly in winter weather, the engine is so cold that the gasoline going through the ordinary channels of carburetion will not mix to a combustible state for some time with the result that great patience and labor is always necessary to start the engine by cranking.

A device to give a mixture that is instantly ignited when drawn into the combustion chambers has been recently marketed under the name of the Liberty Starting Primer, which is guaranteed to produce instant combustion in turn in each cylinder, on the first compression at any temperature down to 20 degrees below zero. It vaporizes the fuel into suspended combustible molecules, regardless of the intake of air through the manifold of the cylinders.



Showing Application of the Liberty Starting Primer.

This vaporization is produced by a slight quick pressure on a push button on the dash. This operates a high pressure force pump from 150 to 300 pounds, throwing the fuel, gasoline, kerosene or distillate through a patented atomizing nozzle with such terrific force that the manifold and ports are completely filled with suspended vaporized molecules of the highest combustible power. The motor has only to be cranked by hand or by any self-starter, and as it takes in air the current draws the suspended molecules into the cylinder, producing instant combustion in turn, in each cylinder, on the first compression.

The Liberty Primer can be easily installed on any Ford car, truck or tractor in 30 minutes and is furnished complete for installation with all necessary parts and instructions. If the car, truck or tractor is not equipped with a standard Ford carburetor it is necessary to specify the name of carburetor and manifold used, so that the proper connections and instructions to attach will be sent with the order. It comes neatly packed in a corrugated box, weighing two pounds, and shipment is made promptly. The price is \$7.

Manufactured by the Liberty Starting Primer Co., 676 Woodward Ave., Detroit, Mich.

THE 1918-19 EDITION OF THE MODERN MOTOR CAR.

The 1918-19 edition of "The Modern Motor Car," by H. P. Manly, which covers in a thorough and comprehensive manner the care, repair and upkeep of practically every type of automobile, has been announced by the publishers, Laird & Lee, Inc., 1732 Michigan avenue, Chicago, who are distributing the book at \$2 a copy.

The new edition has 536 pages, with 325 illustrations, and makes a valuable reference book for the car owner, dealer, garage man or mechanic, as the subjects of construction, care and adjustment of motor car parts, together with shop and roadside methods of trouble location and repair are treated in a simplified style, while information is also given on how to buy, make and use materials and supplies. The latest developments in automobile and repair shop practises are incorporated in the volume, bringing it up to date and covering practically every point which would interest one in most every branch of the automobile trade, as well as making it particularly valuable as student's text book.

Increase In Ford Surplus Over \$40,000,000

Balance Sheet as of July 31 Last
Shows Total Assets of
\$203,749,460.

The statement of the Ford Motor Co., filed with the secretary of State of Massachusetts, showing the company's balance sheet as of July 31 last, reveals an increase in surplus of over \$40,000,000. The total assets and liabilities of the company as compared with the previous year have also grown enormously, being now figured at \$203,749,460, as against \$165,975,002 last year.

The statement as filed is as follows:

ASSETS.		
	July 31, 1918.	July 31, 1917.
Real estate....	\$37,117,363	\$28,180,582
Machinery and equipment....	29,335,982	25,637,959
Material in process	44,522,562	46,762,457
Cash and debts receivable ...	91,471,851	64,619,763
Patent rights..	67,997	66,637
Inventories ...	1,231,906	706,286
Investments ...	1,815	1,314
Total.....	\$203,749,460	\$165,975,002
LIABILITIES.		
Capital stock..	\$2,000,000	\$2,000,000
Accounts payable	10,653,327	19,983,256
Accrued expenses	5,950,564	5,952,902
Depreciation reserves	9,902,841	6,433,936
Surplus	175,242,728	131,604,907
Total.....	\$203,749,460	\$165,975,002

Reduce Proposed Taxation On Motor Cars and Accessories

"Motor car owners generally will unhesitatingly acquiesce in the revised taxation which the Senate Finance Committee has just placed upon self-propelled vehicles that are now in use," comments President David Jameson of the American Automobile Association, referring to the action of Chairman Simmons and his Senate associates in practically cutting in half the horsepower tax contained in the taxation measure passed by the House of Representatives.

"It was to be expected that the automobile would be included in the things selected for revenue raising, for, while the average car is nine-tenths utility, we must grant that a fraction of its operation is for enjoyment purposes," avers the A. A. A. head. "With the new rates extending from the lower powered cars at \$5 and the highest ones at \$25, there can be no pronounced objection, especially since the Senate committee also cut in half the tax on new cars, reducing it from 10 to five per cent., and took similar action in regard to tires and accessories.

"In the communication addressed by the A. A. A. to the Senate Finance Committee, we set forth that the automobile already had received considerable taxation attention in the several states and in consequence it would be only just that in passing upon any Federal excise impost, even for war purposes, this fact should be kept in mind. The findings of the committee would indicate that our statement of the case may have met in no small degree the views of members.

"We also presented to Chairman Simmons for interpretation the question of the taxation of a car not in use during the war period, owing to the presence of its owner in service on the other side. The point was raised by one of our directors, Major John A. Hawkins, also an officer of the Automobile Club of Pittsburgh, who wanted to know if a man serving his country would be expected to pay a tax on a car which temporarily rested on jacks. Chairman Simmons brought the subject before the committee and a prompt reply came to the effect 'that in the case of an automobile that is not used at all there is no tax: the tax is upon the use of the car.' Previously there had been some doubt in the matter and the declaration from the Senate committee will be accepted with satisfaction.

"When the Senate will have passed its war tax measure and its conferees and those of the House come together, it is to be hoped that the representatives will concur in the action of the senators in giving the motor car its proper place as a present day necessity."

GENERAL MOTORS NET PROFITS FOR SIX MONTHS \$26,078,120.

The General Motors Corporation re-

ports for the six months ended June 30 last as follows: Net profits after all expenses of manufacture, maintenance, selling and administration, as well as ordinary taxes, insurance and depreciation \$26,078,120; Federal taxes and extraordinary expenditures, \$13,490,861; balance, \$12,587,259; General Motors Corporation proportion thereof, \$12,307,784; preferred dividends (six per cent), \$590,304; undivided profits, \$11,717,480.

The balance sheet, as of June 30 last, compares with the balance sheet as of Dec. 31, 1917, as follows:

	June 30, '18.	Dec. 31, '17.
Assets—		
Permanent investments	\$68,708,687	\$38,921,935
Miscellaneous investments	5,922,688	2,030,273
Cash	31,186,737	18,865,645
Liberty bonds...	9,098,123	1,255,000
Notes and accounts rec....	23,975,413	13,595,539
Inventories	56,219,729	46,559,394
Deferred expenses	1,231,360	854,435
Good will.....	*11,697,508
Total assets..	\$196,342,737	\$133,789,724
Liabilities—		
Preferred stock..	\$19,676,800	\$19,676,800
Common stock..	105,141,700	76,873,300
Outstanding stock sub. cos. not owned by G. M. Corp...	540,500	540,500
Surplus sub. cos.	1,138,558	859,093
Accounts payable	16,032,126	10,665,718
Notes payable..	1,100,000
Taxes pay rolls, etc.	7,287,600	4,358,327
Reserve for two months proportion pfd. dividend	190,768	196,763
Reserve for Federal taxes and extraordinary expenditures..	15,865,735	6,939,019
Reserve for sundry contingencies	2,657,196	1,671,313
Surplus	26,705,753	11,508,392
Total liabilities	\$196,342,737	\$133,789,724

*Good will in the statement as of June 30, 1918, was included in the permanent investment account.

The surplus after payment of dividends at the rate of six per cent. on the preferred stock for the six months ended June 30 last is equal to 11.14 per cent. on the \$105,141,700 outstanding common stock, or at the annual rate of 22.28 per cent. Therefore, it is apparent that during the first six months of 1918 the General Motors Corporation showed earnings on its common stock equal to an annual rate of 10.28 per cent. in excess of the 12 per cent. dividends now being paid on that issue.

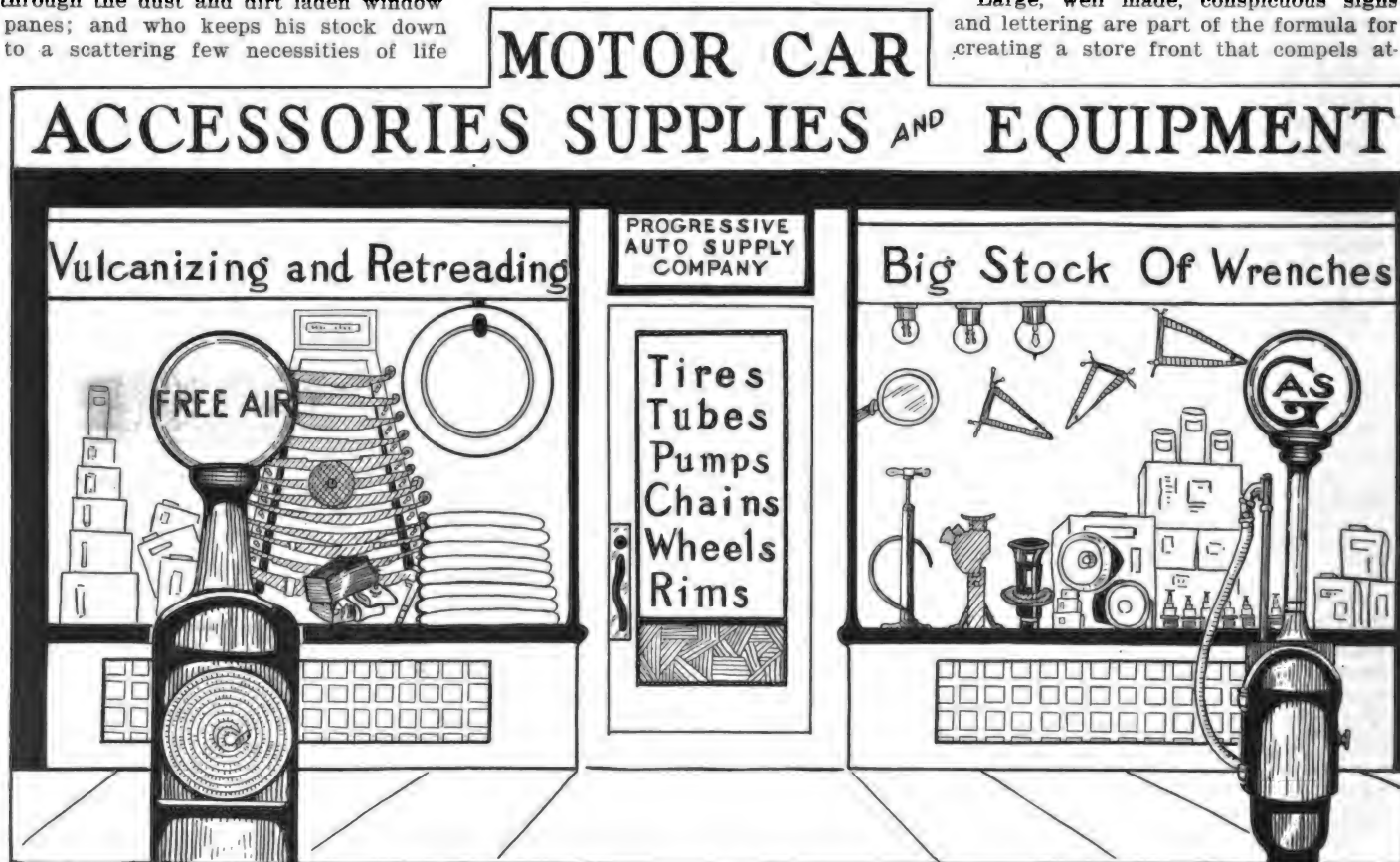
Attractive Store Front and Well Dressed Windows Necessary For Success of Dealer in the Motor Car Trade

The way a large number of automobile accessory and supply dealers conduct their business is suggestive of the archaic system of trade still pursued by the merchant at Podunk Crossroads, who keeps his merchandise well tucked away behind dusty counters in a room lighted by the few straggling rays of sunshine that can find their way through the dust and dirt laden window panes; and who keeps his stock down to a scattering few necessities of life

nishings or anything else, and yet it would seem from the outward appearance of a far too large number of accessory stores that the proprietors think that through some special province they enjoy immunity from the laws of business that are really obligatory if one is to succeed. Almost without exception the prospective customer, in seeking a

which the fact that the proprietor is alive, alert and well prepared to render any service, is not brought alone to the passing motorists, but to the public, so when anyone is asked the location of a place where accessories or supplies are on sale, this man gets the benefit, as his store is the one that has created stronger impression in the people's minds.

Large, well made, conspicuous signs and lettering are part of the formula for creating a store front that compels at-



The Well Dressed Store Front Is the Dealer's Best Asset.

Make Known the Fact That You Are in Business and in It Right with Every Line and Every Service to Offer.

and never orders anything else until he gets an order from some customer.

It will immediately be said that this comparison is drawn with considerable exaggeration and while it may be, the analogy is still true, as there is found an equally sharp contrast in the appearance of the business places of the most prosperous accessory dealers in a town and those who are just hanging on. This situation presents nothing but the working out to form of the adage that "nothing succeeds like success," as the prosperous appearing dealer really prospers and progresses, gaining momentum all the time while the other fellow continues to only hang on.

There is nothing fundamentally different about the business of selling automobile accessories and supplies from that of dealing in hardware, housefur-

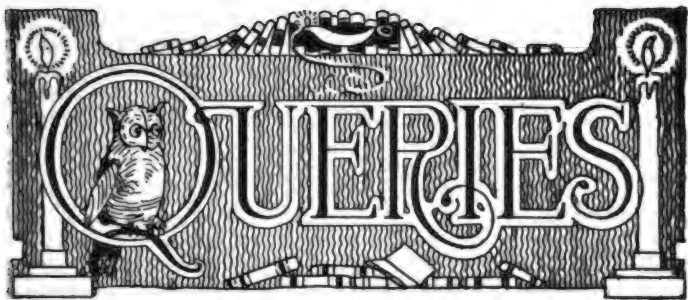
nishings or anything else, and yet it would seem from the outward appearance of a far too large number of accessory stores that the proprietors think that through some special province they enjoy immunity from the laws of business that are really obligatory if one is to succeed. Almost without exception the prospective customer, in seeking a

place to patronize will be influenced in making his choice by the suggestion offered through the outward appearance of the store, and if it is one indicating a progressive policy, that is what determines and fixes the selection. This rule is even more true of motorists in purchasing supplies for their car than with any other class, as it is the most transient business existing.

With these facts well established through experience it should not require excessive persuasion to make dealers in this line realize the utmost importance of having his store front always in the most attractive condition that it is within his power to maintain. This is infallibly true in every place where there is any competition, from the village supporting two stores to the city supporting over a hundred. It is a means through

tention, but other things are equally essential, such as gas, oil and air supply stands at the curb and well stocked windows showing a great variety of articles. While the well stocked window not only lends to the general effect of progressiveness, it also is constantly the means of suggesting accessories and supplies to motorists that stop for gas or air and results in sales.

While there is some talk around to the contrary, there is more accessory and supply business in this country today than ever before and it is only a natural consequence of the unprecedented prosperity that exists on every hand and the man in this line of business, if he is in it to any extent, should make hay while the sun shines, as if he doesn't drive his business it will surely drive him and will drive him out.



NOTICE TO READERS

In this department the Mechanical Editor answers all inquiries sent in by readers concerning any information as to the repair, maintenance, adjustment, use or abuse of the motor car or any of its parts. The service is free to every subscriber. Letters should always bear the writer's name and address, and the car, part or trouble which is the subject of the inquiry should be carefully identified and described. Be sure and give name and model of your car.

Any interesting letters received, bearing on timely subjects as to the maintenance and operation of motor cars or describing new and practical suggestions for the car owner or motor mechanic, if published, will be paid for at space rates.

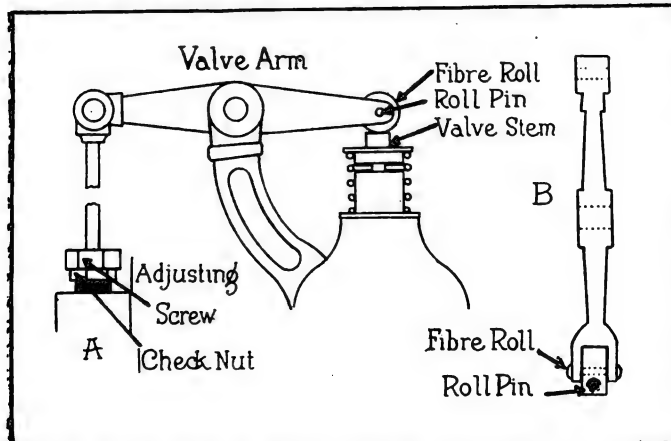
Address all communications to the Mechanical Editor.

SILENCING OVERHEAD VALVES.

(A. L. G., New York City.)

The valves on my car are of the overhead type, and they have developed a rattling sound. Can you tell me how I can fix them and eliminate the noise without going to much expense, as the car is a very old one and I do not wish to expend much money on it.

On the majority of overhead valve type engines small fiber rolls are generally fitted on the valve arm at a point where it touches the valve stem. This is done for the purpose of obtaining noiseless operation. As a rule these rolls are allowed to rotate as they please. At times they do this with a certain regularity, while at other times they remain stationary, which, of course, results in uneven wear of the rolls. When they are allowed to run unevenly the result will be uneven



Illustrating How to Silence Noisy Overhead Valves.

timing and an engine that does not operate smoothly. A simple way to overcome the noise you mention is to remove the valve arm and slightly rivet the pin upon which the roll is mounted. It will require only a little riveting to make the roll stationary. The valve arm and the roll when adjusted is shown in the sketch at B. You can then time the valves with some degree of accuracy. When the rolls become so worn that a gap larger than is required appears between the valve stem and the roll, adjustment can be made by letting out on the push rod adjusting screw.

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TIMES BUILDING
PAWTUCKET, R. I.

REGULATING HUDSON CONTROL.

(G. I. C., Taunton, Mass.)

My car, a Hudson Six, 1916, uses too much gas. I start of course on "choke," moving over to "cold" as soon as the engine gets hot enough. I then run with accelerator. The plugs are clean and so are the cylinders, but I cannot get more than 10 miles per gallon, sometimes less. I never run fast, averaging about 15 miles per hour.

If your engine is in good condition and the various adjustments correct, as they seem to be, would suggest that you study the instructions given below and if better results are not obtained would advise that you take your car to the man in your town who makes a specialty of repairing Hudson cars and have it looked over.

When the carburetor air control lever is turned to "hot," or center position, hot air is drawn from the exhaust manifold through the carburetor. This position is most suitable for cold weather, as warm air helps to volatilize the fuel. When lever is turned toward left to "cold" on dial, only cold air is taken through the carburetor. When turned to "choke" on dial the control is in the choked or "strangled" position. In this instance the air supplied to the carburetor is materially decreased and suction from the motor increases the quantity of gasoline drawn into the cylinders.

This lever should be turned to "cold" in warm weather and to "hot" in cold weather. In starting, especially in cold weather, it may be turned to "choke" to assist in priming the cylinder. Whenever the "choke" is used the hand throttle must be opened one-third when cranking. By turning the lever to choke position, thus applying the choke before turning off the ignition, the cylinder will be supplied with a rich mixture of gas, which will materially assist in starting next time.

There are various other positions between these three indicated, which may be used for different weather conditions, the correct point being determined more or less by experimenting with the car in operation. It is possible that some of the following troubles may be responsible for the poor mileage you are obtaining: Loss of compression due to leaky valves; too rich a mixture through some defect in carburetor, probably flooding due to grit under float valve; late ignition; lack of water in radiator or oil in motor, causing the motor to run hot; poor grade of gasoline, in cold weather, causing too weak a mixture; dragging brakes; see that the car can be rolled by hand easily or that it will coast down hill when clutch is released and not slow down; feel the brake drum with your hand to determine over-heating; flat tires; stoppage of the jets in carburetor due to dirt or sediment.

In the compensator there is a pocket of gasoline in the passage, and also around the main jet, when the well is in action, supplying the motor for idling purposes. Immediately the throttle is opened the suction on the top of the cap jet commences to draw gasoline from it and also from the main jet. Before these jets settle down to deliver their steady flow, however, the pocket of gasoline contained in the space between the jet and cap jet and in the passage leading to the compensator must be examined. This sudden enriching of the mixture when the throttle is opened gives the engine better acceleration than otherwise would be possible without using an over-rich setting at all times. The size of the compensator does not affect this condition, but the level of gasoline does, since it decreases or increases the amount of gasoline in the pocket, according to whether it is too low or too high, respectively. The gasoline level should come exactly 3/16 inch below the top of the cap jet.

After the pocket of gasoline is exhausted the main jet and the compensator supply the gas necessary to run the motor at the higher speeds. It is easy to see that where there are two small openings instead of one large one there is a much greater range possible for varying the flow. To cut down the amount of gas used, therefore, either one may be changed for a smaller size. The determination of the best one with which to commence operations can only be made after they have both been removed and their sizes noted. The compensator is usually "five" larger than the main jet for ordinary climate and normal running, say up to 40 miles an hour. For hill climbing in normal altitudes and where constant pulling power is needed without excessive speed on the

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level, "10" larger will be better. If more speed than 40 miles per hour is required and that on good level roads, or where there is always a good run at the hills and they can be climbed as fast as the car will go, the main jet will need to be equal to or larger than the compensator, according to the speed of the motor.

The two always work together, but the compensator is affected most by the lower speeds up to 20 miles per hour, and the main jet is affected by the speeds above 20 miles per hour, and it becomes more noticeable as speeds above 40 miles per hour are reached.

In reducing gas consumption it is safe to assume that the size of the main jet can always be reduced first. If this step affects the acceleration too noticeably, increase the compensator "five." This may strike a happy medium. Economy and speed, and especially "jam down the throttle" acceleration never go together. The most economical setting will give only normal acceleration unless the accelerator pedal is depressed gently, and the throttle must never be slammed upon suddenly or the motor will starve, especially if it is at all cold. It does not require very much mixture to supply a motor running at 665 revolutions 20 miles per hour, and the throttle does not need to be open but very little to keep it running at this speed. To accelerate at low speeds, therefore, the throttle must be opened slowly, thus feeding only the amount necessary and vaporizing it more perfectly by drawing it past the small opening around the throttle valve, or churning it. Rapid acceleration with a wide open throttle can only be obtained by excessive use of gas, no matter what make of carburetor be used, and it cannot be done economically.

CARBURETION TROUBLES WITH A FORD.

(A. M. R., Sprngfield, Mass.)

I have a Ford Sedan, 1917 model, equipped with a Gray & Davis starting and lighting system. The gas tank holds but nine gallons. As the gasoline is fed by gravity I cannot make long, heavy, upgrades with the Stromberg carburetor I recently put on if my tank is not completely filled, and once I failed under this condition on a long 12 per cent. grade, something that never happened while I had the original carburetor on my car. This change has also resulted in a heavier consumption of gas than lower.

I would also like to know if there is a small auxiliary tank on the market that can be placed under the hood, which, with proper connections to the instrument board, could be used in climbing steep hills. Something tight and safe, holding half a pint or little more.

Assuming that you have installed a model L Stromberg on your Ford, as that is the type designed for the purpose, it would appear that your principal trouble lies in the gasoline connections. There is a small pipe section, "U"-shaped, furnished with the Stromberg to be used in connecting it with the main feed line. A number of instances have been called to our attention wherein this section has been fitted with the bend in a position above the two ends, instead of laying flat on a level with the connections. When this mistake has been made trouble always ensues, as the flow of gasoline would readily become locked in the "U" unless there was considerable pressure behind it. Trouble from this cause would of course increase when the car was ascending a grade as the "trapping" action in the bend would become more complete. If this connection, however, has been properly fitted and the trouble continues it would be a good idea to test out the gasoline feed line from the tank and see that it is absolutely free of obstructions. After this has been ascertained the carburetor should be thoroughly cleaned, and then the only question remaining is that of control and adjustment of the latter.

The model "L" Stromberg is a compensating jet type and differs from others in that air is introduced into the gasoline before it emerges from the jet, which is composed of a series of holes drilled around the throat of the venturi passage, and arrangement is made for supplying a small quantity of rich mixture above the throttle for idling. A little mixture flows directly in the manifold above the throttle for starting and provides a good mixture when the throttle is practically closed.

After the engine has been thoroughly warmed up with

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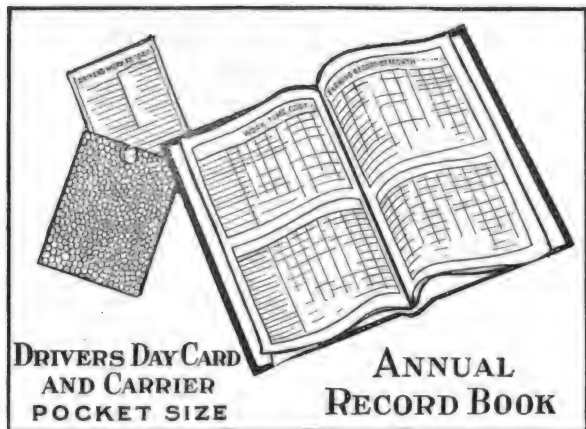
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the gasoline feed adjusting screw opened about 24 notches, so that the exhaust burns black, showing too much fuel, turn this screw down slowly until engine begins to miss, and then turn it up gradually until there is even firing. This adjustment should be made at various engine speeds. For idling turn the other large screw which enters the intake section of the carburetor between $\frac{1}{2}$ and $1\frac{1}{2}$ turns clockwise off the seat. After the engine has been warmed up this may be regulated. Turning to the right gives more gas; and to the left, less gas. This adjustment has effect only when the throttle is nearly closed.

The spark should be fully retarded and the throttle opened to a position which turns the engine at a speed corresponding to about 20 miles per hour to adjust the economizer. The lever should be set one notch less than for a mixture on which the engine will run steadily and under normal conditions this should be the third or fourth notch.

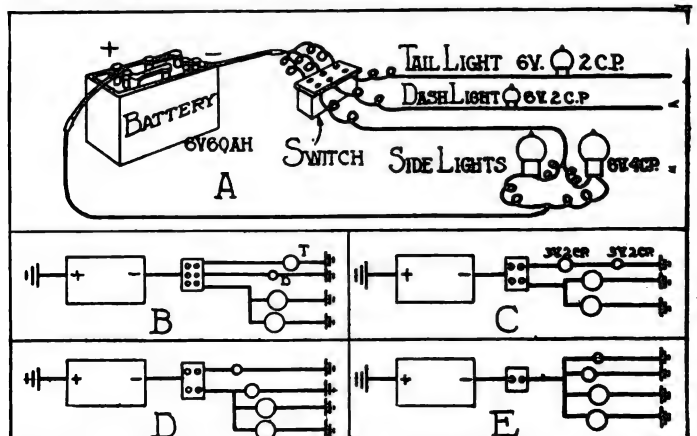
As to the use of an auxiliary tank to overcome the difficulty you experience with the feed on grades, would advise that you purchase one of the various vacuum feed systems that are on the market. These are designed specifically for this purpose and should give entire satisfaction.

FORD LIGHTING PROBLEMS. (N. E. H., Bridgeport, Conn.)

Will you kindly publish a diagram of the wiring system on the 1914 Ford lighting circuit for electric lights from storage battery six volt, 60 amperes, to aid me in converting my side lamps and tail lamp and to install a small dash lamp on a switch. Would also like to secure information to aid me in placing an electric light on the rear end of a Ford landaulet from the magneto and as to how the wires could be connected to the regular Ford lighting switch.

In answer to the first question would say that there are several ways to do this and some of these we show so that you may select the one you think best adapted to your needs. Of course you realize that it must not be attempted to use the storage battery in connection with the Ford magneto as a means of keeping it charged. That magneto or generator is an alternating current affair, while storage batteries and charging dynamos or generators are direct current. So unless you anticipate installing a charging generator, it is a straight proposition of connecting the desired lights from a battery, which is what is shown.

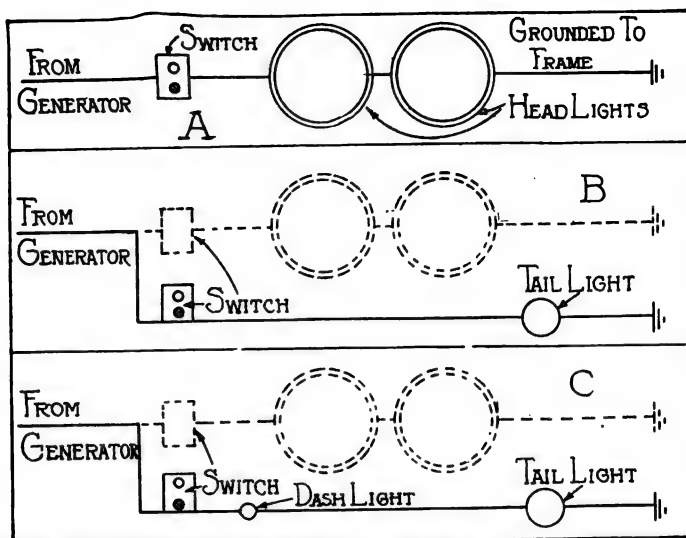
Adapters for converting oil lamps into electric are procurable at most any automobile supply house and are easily attached. Also, it is possible to obtain a transformer for your headlights so that you can have a steady light at all speeds of your motor without the danger of the lights burning out at excessive engine speed.



Several Ways of Wiring a 1914 Ford Car for Electric Lights from Storage Battery.

The diagrams shown will be easily understood with the possible exception of the one where the dash light and tail light are in series. This is done to give a positive means of knowing that your tail light is lit. To accomplish this end three-volt bulbs are necessary, which are put in series with each other.

The first diagram shows each set of lights controlled by a separate switch using a two-wire system. The second (as



Plan for Installation of Electric Lights on Ford Landulet.

well as the others) show a grounded system, i. e., using the frame or metal part of the car for the return circuit. While in this particular case it is immaterial, it is usually the custom to ground the positive or + marked terminal of the battery. With a 60 ampere-hour battery any one of the wiring arrangements shown ought to run all the lights for about 23 or 24 hours continuously by using the Mazda C lamps.

Regarding the installation of a rear light on the landulet, adapters for transforming oil lamps into electric lamps, can be procured at automobile accessory stores. These do not prevent the oil lamp from being used should the electric system fail you. To utilize the regular magneto current for the tail light will generally be found unsatisfactory. You probably know by experience with electric headlights that at times they are very dim and then again they are often excessively bright. By the nature of the apparatus this is unavoidable without some change or added accessory. So if utilized to light the tail lamp you might at times find embarrassment in that it might not comply with the requirements of the law.

To have a steady light in the rear either install a storage battery or a set of dry cells. These, of course, must be used independently and not connected up in any way with the generator, or magneto. However, should you, in spite of the disadvantages stated, desire to have the generator furnish current for the tail light, you can easily do so. You can either connect to the wire supplying the headlights at the switch for the same or you can connect at the source of current and have a separate switch for the tail light.

If your car is a 1915 or 1916 model get a bulb called G-6 18-24 volts. If the car is a 1914 or earlier get a G-6 12-16 volts bulb. If you wish a positive means of knowing if the tail light is working, install a small dash lamp in series with it so that it will burn or go out just as the tail light does. In this case get G-6 10 volt bulbs for 1915 or 1916 cars or G-6 6-8 volt bulbs for other cars. Connect as shown in illustration.

CARE OF BRAKE BANDS.

W. G. F., Dover, N. H.)

Recently while out riding I used my emergency brake in stopping and when I wanted to start again the brake would not release. By having a friend work the lever back and forth while I shook the car and struck the wheels, we released it. Can you tell me what made it stick?

It would seem that your trouble is due to the shoes of the internal expanding brake being worn, so that when the cam which expands the brake is operated it turns sufficiently to become horizontal in position. This makes it impossible for the springs connected to the brake shoes to release the brake from against the inside of the brake drum. It is best to fix this at once; you may not always be able to release them in the manner you describe, and the trouble grows worse with neglect. You should either have new brake shoes fitted or have pieces added that will reduce the clearance between the shoes and the cam.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

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YOU get a skidding action from unequal braking influence. You can easily avoid this annoyance by lubricating differentials with



it will not throw from the casing, but gives perfect lubrication until entirely used up.

You will find it worth while to use NON-FLUID OIL on other parts of your car. It stays in bearings, keeps them well lubricated and actually costs less per month for better lubrication.

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WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.


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**The Best Wrench
The Cheapest**

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THE DELCO-BUICK WIRING.

(E. A. M., Brockton, Mass.)

Can you explain the Delco-Buick wiring on my model E-645. I have had considerable trouble with the battery, which runs out too frequently, and I believe this trouble is caused by a ground connection somewhere in the system, because the ammeter indicates "charge" when the engine is running and the lights are not on.

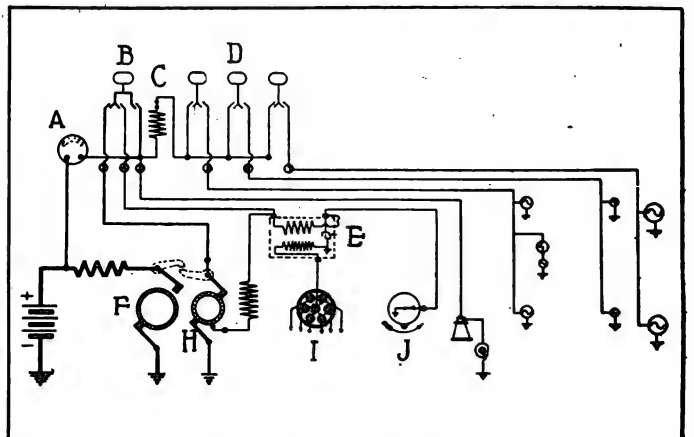
You should be able to locate a ground or short circuit in the system, but you will first have to procure a testing outfit or make one by obtaining a light socket and placing in it one of the headlight bulbs. The wires leading from this will be referred to as testing points in the following instructions.

Disconnect the positive battery wire from the battery and touch one test point to the wire and the other to the battery terminal, making this test with all switches off. If the bulb glows or lights, disconnect the wire from the ammeter. If bulb goes out when this disconnection is made, indications are that the ground is on the other side of the ammeter.

Should the bulb remain lighted, disconnect the heavy wire leading from the battery to the motor at the motor end. If the light goes out the trouble is in the motor and it would be advisable to consult an expert repair man and have him make a thorough examination of the motor.

In case the bulb should remain lighted the indication would point to a ground between either the battery and ammeter or between the battery and motor.

In the first test, if the light glows and indicates trouble



Delco-Buick Wiring on Model E-645. A, Ammeter; B, Ignition Switch; C, Cut-Out; D, Lighting Switches; E, Ignition Coil; F, Motor; H, Generator; I, Distributor; J, Breaker Box.

on the other side of the ammeter, the circuit is probably grounded in the horn wire. To make certain of this, disconnect it at the switch (3) and watch the light bulb. If the light goes out the circuit is grounded in the horn wire, otherwise make careful examination of switch connections and be sure that all connections are made as in diagram. Also make certain that all lint, dirt, dust and other foreign matter is removed from the switch terminals.

For the second test, in case the light does not burn in the first one, try each lighting switch in succession. In every case bulb will glow, but if it burns at full candle power the ground connection is in the lighting circuit controlled by the switch, which causes the bulb to burn full candle power.

If the trouble is not located in either of these tests, pull out switch B (ignition) with lamp connected as in first case and all lights off and the light will probably burn. Disconnect wire No. 2 at generator and wire No. 4 at ignition coil. If lights continue to burn the ground is on one of these wires. Disconnect each in turn at the switch to locate the trouble.

After removing the test lamp and restoring all connections, pull out ignition switch and note whether the generator motor shaft revolves. If the shaft does not revolve the unit is at fault and a repair man should be consulted. If it does revolve the starter works properly and the ignition unit functions, the battery charging trouble is due to low charging current, in which case it would be advisable to seek the advice of an expert on generator troubles.

AUTOMOBILE JOURNAL

DEVOTED TO

OWNERS OF NEW AND USED CARS DEALERS AND REPAIRERS

VOL. XXVI

RAWTUCKET, N. J., NOVEMBER 10, 1918



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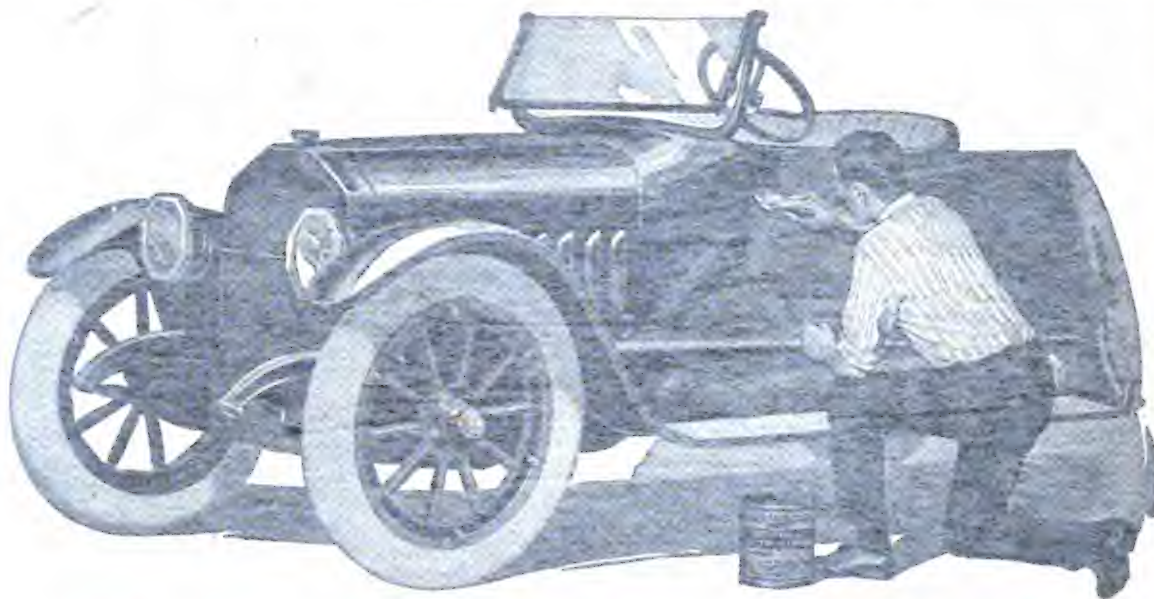
Compare it with the cost per mile of any other make.

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Hood Tires are created to excel. They do. That is why they are the talk of the country.

If you do not find the Hood Dealer somewhere near you, look for him on the page opposite the contents page in the 1918 Blue Book. Or, write to us.

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The manufacture of pleasure cars ceases on January first. As production stops, the value of every used car automatically increases. Why not protect your investment and further increase its value? Many a smooth running motor is cheapened by a dingy body.

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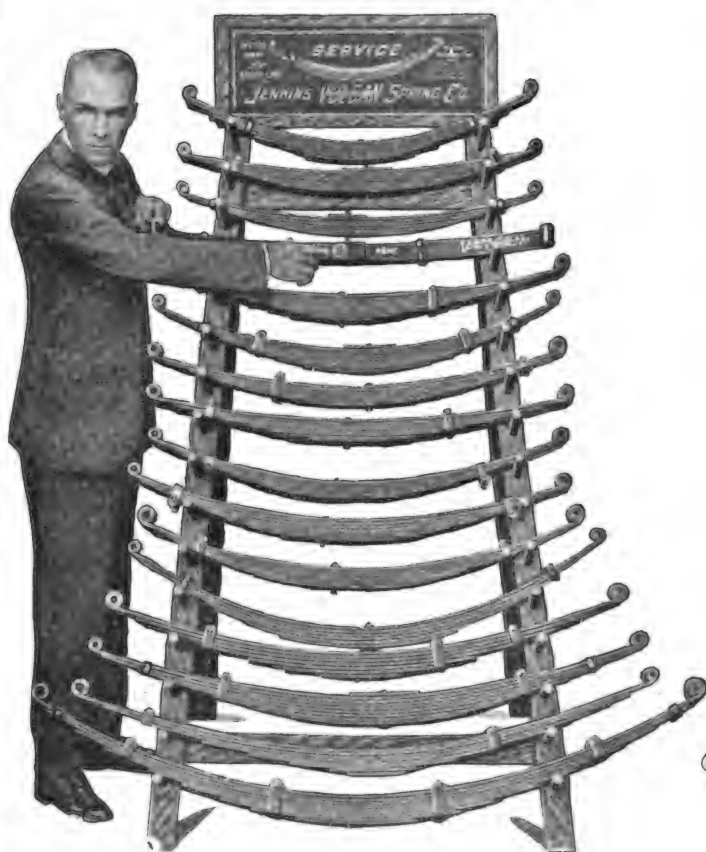
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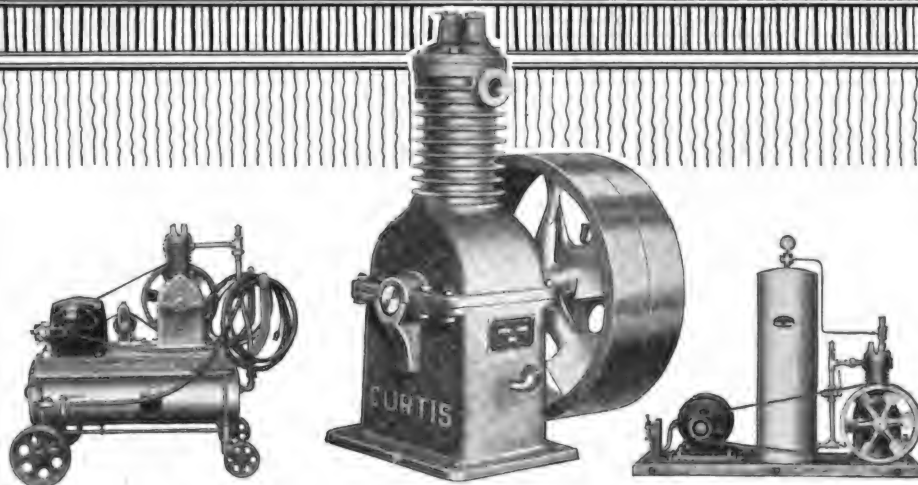
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AUTOMOBILE JOURNAL

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Attractive display material accompanies each order.
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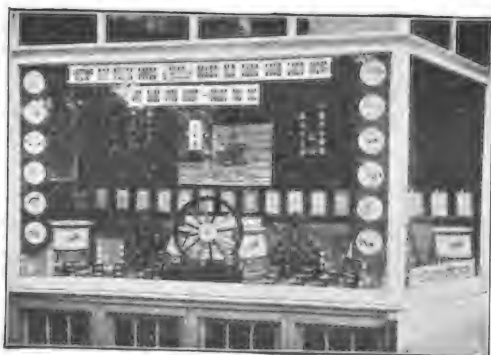
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EIGHT COLORS

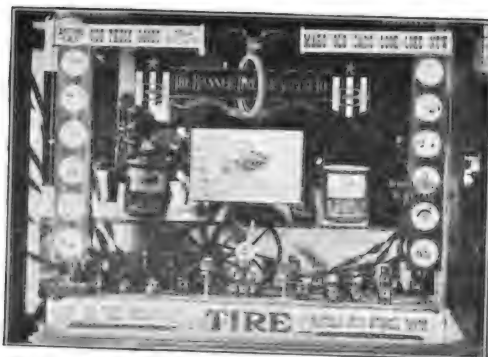
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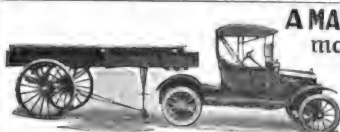
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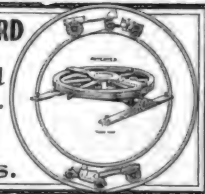
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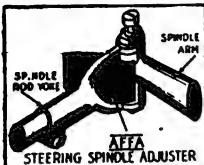
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Rear Axles	15.00 "	Gears	1.00 "
Front Axles	5.00 "	Bearings	1.00 "
Cylinders	5.00 "	Radiators	10.00 "

\$12 Diamond Bumpers.....\$5.50

Jobbers in Bankrupt Auto Supplies.

BRIGHTMAN AUTO EXCHANGE

84 Wooster St., Hartford, Conn.

Truck Tires

ALL KINDS AND SIZES

40% to 60%
FROM LIST PRICES

MATHEY BROS. Inc.

72 Cummington Street, Boston, Mass.

EXPERT REPAIRING; every known Magneto and Ignition System, Starters, Motors, Generators. Magneto Exchange and Repair Shop, 269 Halsey Street, Newark, N. J.

BREEN'S PIANO DERRICK

What Everybody Needs.

SAVES TIME, MEN AND MONEY.

Piano movers find that the hoisting and lowering of pianos is made easy, safe and economical by the use of this practical, adjustable Window Derrick. Handy to carry, easily put in place by one man, always ready and quickly utilized.

It is a practical, patented invention which has been in use for 12 years and has demonstrated its value beyond question. It clamps to window. There is also a swing under bar, which is placed under outer end of piano and carries it in or out.

Every mover of safes, pianos or heavy merchandise needs Breen's Piano Derrick because it saves the strength of the men, means a tremendous saving of time and obviates jams and scratches. Several firms have taken out third-story window, set the derrick in place, hoisted piano and replaced window in 25 minutes.

THE DERRICK COMPLETE, \$40.00.

Also manufacturers of Belts and Bars to hold Pianos, and Ropes, Blocks and Piano Covers.

Write today. Catalogue for the asking.

WM. H. BREEN,
219-231 Rutherford Ave.,
Charlestown, Mass.

ENGINE DRIVEN TIRE PUMP FOR FORD CARS

This pump is made especially for Ford cars, is as efficient and simple in principle and construction as it is in operation; drive gear attached to crank shaft and no machine work or drilling required.

Our price complete, \$3.50

BASCOM

224 Columbus Ave., Boston, Mass.

GUARANTEED AUTO PARTS

At Worth While Savings.

We have in stock at all times parts for almost every make of car.

MAGNETOS, CARBURETORS, WINDSHIELDS, REAR ENDS, TRANSMISSIONS, GEARS, ETC.

Your orders are given prompt attention. Write us your needs today.

USED TRUCKS.

Suitable for all kinds of delivery and hauling; all in perfect mechanical condition.

We can offer excellent bargains while they last. Let us hear from you.

BOULEVARD MOTOR CO.

Phone—Cambridge 1621
276 River St., Cambridge, Mass.

TRUCK OWNERS

What arrangements have you made to protect your Trucks against skids next Winter. It is a long way off, but so is the material.

NATHAN E. PACKARD,
231 Warren Ave., Brockton, Mass.

Sell Non-Freeze Protection You Can Show



NORWESCO "Twelve-Twenty" comes ready-mixed with a specific gravity of 1220. You can *show* the motorist a hydrometer test in a few seconds. Explain to him that so long as his solution is maintained at that strength he is absolutely protected to 20° below zero. And *he can test* his solution at all times, diluting or strengthening it as the heat evaporates or leakage weakens it.

You Sell Certainty Not Guesswork

"TWELVE-TWENTY" comes ready-to-use. You can deliver it *in the radiator* without measuring, mixing or dissolving. Merely drain the radiator and pour in "TWELVE-TWENTY."

You'll hear no complaints, either, about "TWELVE-TWENTY" "finding" leaks like the ordinary solutions commonly used. Its boiling point is 12° higher than water, therefore it evaporates more slowly.

"TWELVE-TWENTY" warms the engine quickly, causing it to settle into a smooth, steady motion sooner than it does with water in the radiator.

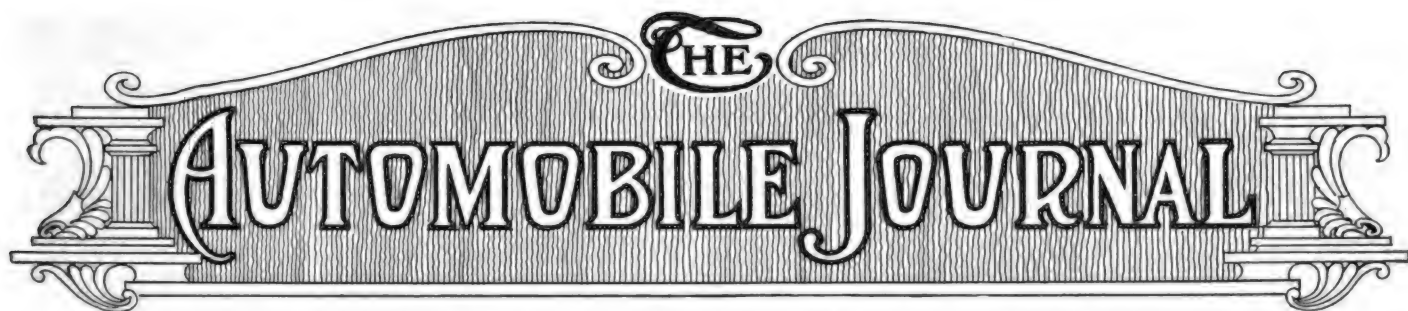
"Twelve-Twenty" is certain to become a tremendous profit-earner for the dealer like the rest of the Norwesco Line, among which are SE-MENT-OL, the radiator cement with a million users, and SKALEX the radiator cleaner.

The Northwestern Chemical Company
711 State Street Marietta, Ohio, U. S. A.

"TWELVE-TWENTY" will be pushed by a great advertising campaign in the *Saturday Evening Post*. You know what that means.



(When Writing to Advertisers, Please Mention The Automobile Journal.)



VOL. LXVI.

PAWTUCKET, R. I., NOVEMBER, 1918.

NO. 4.

INDUSTRY URGES SUPERVISION BY PEACE INDUSTRIES BOARD

Manufacturers in Conference Propose Governmental Control of Reconversion to Normal Production to Insure Against Conditions That May Result in Retardation or Demoralization—No National Shows Until 1920—Car Shortage of Planned Output of Year About 1,000,000—Truck Production Much in Excess of 1917's 160,000 Is Regarded as Certain by Builders

REPRESENTATIVES of more than 100 automobile manufacturers at the special meeting of the National Automobile Chamber of Commerce, in Washington, on Monday, discussed the after the war program as it relates to the return of the big industry from a war to a peace basis. The keynote of the discussion involved suggestions that the elimination of war work should progress with a constant view as to the effect on labor.

It was suggested that the War Industries Board should become a Peace Industries Board to act as a balance wheel in the conversion, and committees were appointed to cooperate with them in this work. The Passenger Car Committee will be Hugh Chalmers (Chalmers), Alvan Macauley (Packard), Harry M. Jewett (Paige-Detroit), Roy D. Chapin (Hudson) and Charles Clifton (Pierce-Arrow), and the Motor Truck Committee, George M. Graham (Pierce-Arrow), Windsor T. White (White), R. H. Boyston (Service), S. M. Williams (Garford) and A. C. Burch (Clyde). President Charles Clifton occupied the chair and practically every big motor company was represented, including Packard, Pierce-Arrow, Locomobile, Paige-Detroit, Studebaker, Cadillac, Buick, Chevrolet, Chalmers, Peerless, Overland, Cole, Hudson, Hupmobile, Maxwell, Kissel, Reo, Mitchell, Briscoe, Ford, Liberty, Premier, Lexington, Oldsmobile, Moline and Stutz.

Manufacturers Reject National Shows.

The manufacturers decided by an overwhelming vote not to hold national shows at New York and Chicago in the winter of 1919. They were actuated by the belief that it would not be possible to prepare such exhibitions as will do justice to their desire to present at the proper

time such a display as will be representative of the industry and properly celebrate the victory in which it has had so prominent and successful a part.

It was brought out at the meeting that the normal production of passenger automobiles for 1918 would have been about 2,000,000, as 1,718,000 were produced in 1917. The output was curtailed voluntarily 30 per cent. last March, and again in July was reduced to 50 per cent. of the production rate last year. Under this curtailed program it was estimated that the output in 1918 would be less than 1,000,000, creating an artificial shortage of approximately 1,000,000 cars for the year.

As rapidly as possible the industry will get back to regular passenger car production, but reconversion from war conditions to peace activities will take some time, so that the industry cannot get into full production until some time next spring. Prices of cars will probably remain at present levels, owing to the high prices of materials and wages and the fact that price reductions can come only with increased volume of production. The industry has shown that with greater production come lower prices and better cars.

Greatly Increased Truck Production.

Truck production was greatly stimulated by the war and plans for the year 1918 were on a greatly expanded basis, but through the action of the War Industries Board, due to the shortage of iron, steel and other materials, the truck manufacturers were limited to approximately the same rate of production for the last half of this year as during last year, when the 12 months output was 160,000.

It was shown that the automobile industry as a whole contributed more

toward the winning of the war than any other peace industry of the country, except steel. As the third largest manufacturing industry it took on more than \$1,000,000,000 of war orders, including Liberty motors for airplanes, many thousands of motor trucks, officers' cars, trailers, tanks, ambulance bodies, shells, mine anchors, submarine chasers, gun recoils, helmets and many other articles not related to the motor vehicle industry.

In this war of motors—on land, on water and in the air—the automobile industry has been absolutely indispensable. It has contributed more important personnel to the military program than any other, including hundreds of technical men, such as mechanical engineers, metallurgists, chemical engineers and production managers, many of whom have been commissioned as colonels, majors and lieutenants, and thousands of chauffeurs, repair men, etc. Seven thousand mechanics were sent to France by June last to serve in the Signal Corps. Even in the aviation field the personnel was drawn largely from the automobile industry, including the leading American ace, Eddie Rickenbacher, who was a prominent automobile racing man. Practically all the Liberty and other airplane motors and many airplane parts have been produced in automobile factories, which were the only plants in the country possessing sufficient manufacturing equipment to produce such engines and parts in the necessary volume.

With reconversion to peace production of automobiles and trucks, it is anticipated that exports will be greatly increased, as it has been impossible to fill the foreign orders during the past year, owing to lack of shipping and shortage of materials.

Maibohm Six For 1919 Has Aircraft Type Power Plant and Is Much Refined

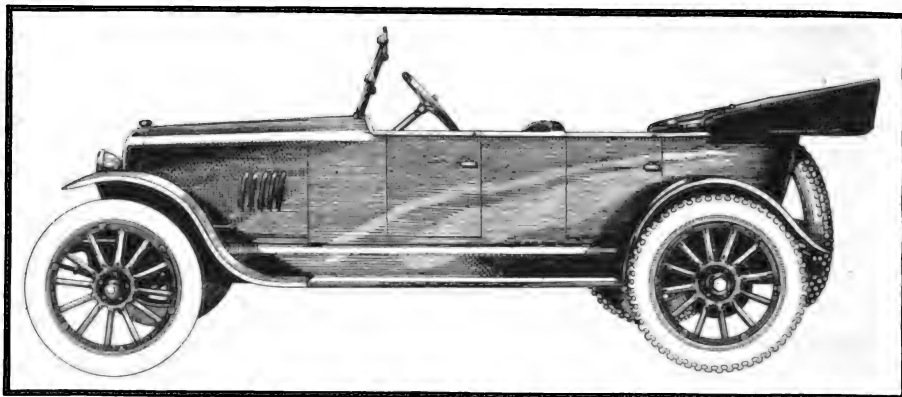
THE Maibohm Motors Co., Racine, Wis., continues its six for 1919 with a new line of bodies that are distinguished for their remarkably good lines and high class coach work.

The chassis is fundamentally the same as the one on which the company has been concentrating its production for the past two years, such minor changes as are evident being more the nature of refinement.

Improved channeling of the gas passages and the delivery of fuel through pre-heated intakes permits the efficient use of low gravity gasoline with a remarkable degree of economy.

The crank case has been changed to permit the new S. A. E. installations of generator, starting motor, distributor and carburetor.

The new phaeton bodies are now equipped with real leather upholstery. The seats are wider and deeper and body edges are sharply beveled.



The Maibohm Six Chassis Equipped with a Phaeton Body with Folding Top, the Streamline Design Being Especially Effective—This Is an All-Purpose Type Greatly Demanded by Discriminating Buyers.

an abundance of power with a smoothness of action free from vibration through all its speed ranges.

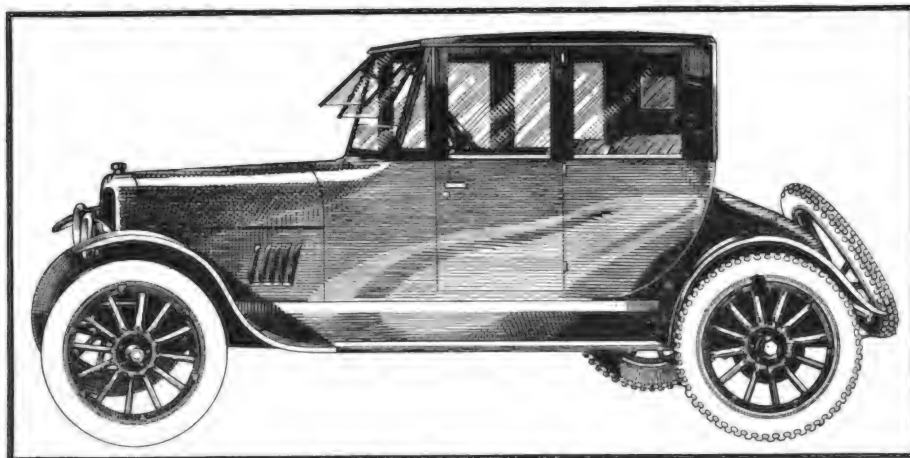
of low gravity gasoline with a remarkable degree of economy.

Light weight, perfect balance and long leafed springs of the semi-elliptical pattern give a new standard of comfort for town use of touring. The improved spring suspension eliminates the tendency to sidesway.

Underlying these features are standard qualities which Maibohm has carefully developed in its policy of concentration on one chassis model—safety, riding qualities, smoothness of operation, extreme road ability—an ease of handling and style.

Specifications.

Engine—Six-cylinder Falls, exclusively built for Maibohm, featuring advanced engineering principles of modern aircraft engines; minimized weight, overhead valves, detachable cylinder head, counterbalanced crankshaft, light pistons and weighted connecting rod assemblies. It is silent and vibrationless through all speed ranges and capable of extremely high speed under load. Especially designed for economical carburetion of low gravity fuel. Bore, 3 3/4



Maibohm Six Chassis with Brougham Body, This Having a Seating Capacity for Four Passengers and Suited for Town or Country and All-Year-Round Uses.

Curtains are designed to swing open with the doors and two oval nickel plated curtain light rings have been added to the rear top curtain.

The company is laying extensive plans for a greatly increased "after the war" production. The models are priced as follows:

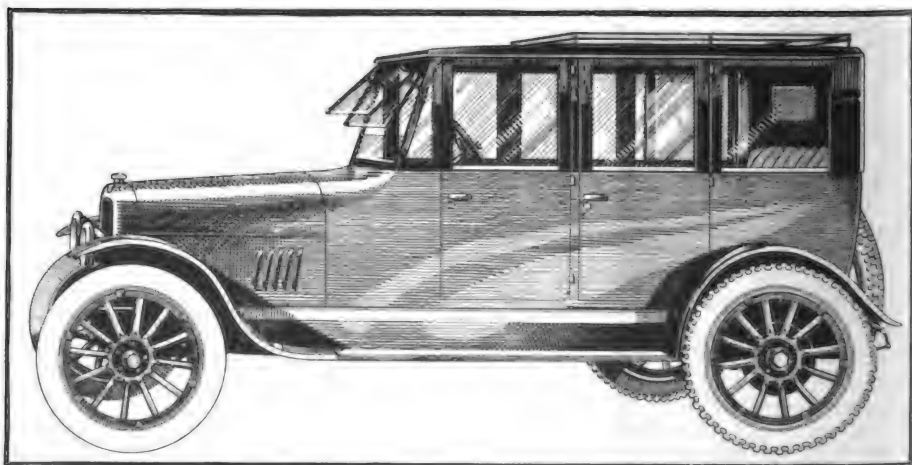
The Chassis.....	\$1160
The Phaeton.....	\$1290
The Touring Sedan.....	\$1890
The Brougham.....	\$1890

Chassis Details.

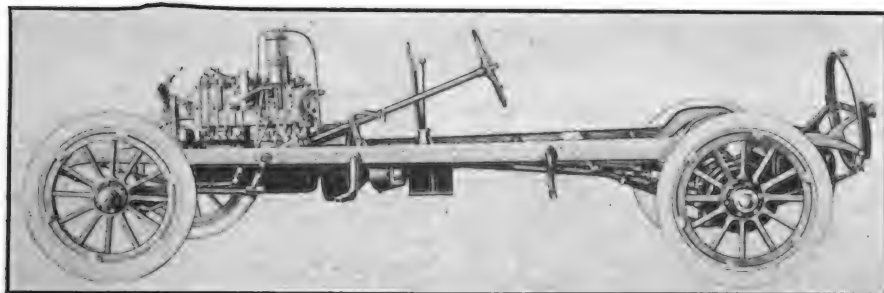
In principle of design, in materials of construction and in method of production the new Maibohm chassis typify to a greater degree the present standards fixed by the Society of Automotive Engineers. It is in the new trim and simplified aircraft power plant that a startling progress is revealed.

Minimum weight, valves in the head, a counter balanced crankshaft and perfectly balanced reciprocating parts deliver

An improved channeling of the gas passages and the delivery of fuel through preheated intakes permit the efficient use



Maibohm Six Touring Sedan, Having Practically All the Qualities of Both Open and Closed Bodies, with Seating Capacity for Five—An Ideal Vehicle for General Purposes.



Side View of the Malbohm Six Chassis, Stripped of Dash, Footboards and Fenders and Running Boards, Showing the Spring Suspension and the Location of the Control Members.

inches; stroke, $4\frac{1}{4}$ inches; displacement, 195.6 cubic inches; S. A. E. horsepower, 23.44; develops 46 horsepower at 2290 revolutions per minute; maximum speed, 3510 revolutions per minute; weight, 425 pounds; valves in head; diameter, $1\frac{1}{2}$ inches; lift, $\frac{9}{32}$ inches. S. A. E. nickel steel. Simple adjustment at cylinder head.

Crankshaft—Wyman-Gordon counterbalanced high speed $1\frac{1}{2}$ inches diameter, three bearings. Front, $2\frac{1}{2}$ inches; center, two inches; rear, three inches. S. A. E. nickel steel.

Lubrication—Cam-operated piston pump maintaining a steady stream to main bearings, splash from constant level troughs to cylinders.

Cooling—Thermo-syphon, Perfex radiator, two inches inlet and outlets.

Carburetor—Stromberg L. B., with economizer. Foot and hand control.

Fuel Supply—Stewart vacuum system with 14 gallons rectangular tank in rear. Dial gauge and convenient filler.

Ignition—Atwater Kent, manual advance. Distributor mounted to S. A. E. standards on left, rear deck of crank case and driven from camshaft in an independent unit.

Starting and Lighting—Wagner six-volt, two-unit system. Bendix drive starter. Generator drive through helical gears in front gear case. Both mounted to S. A. E. standards.

Battery—Willard six-volt, in steel cradle under front floor boards.

Clutch—Borg & Beck.

Transmission—Mechanics selective; three speeds, one reverse. Mounted to S. A. E. standards in unit with power plant. Gears S. A. E. nickel steel specifications No. 2340; 7-9 pitch, $\frac{3}{4}$ inch face, 200 involute teeth.

Controls—Center. Overhung levers with-

hand, internal expanding; on rear wheel drums; diameter, 12 inches; width, two inches; lining, wire woven asbestos. Simple, positive adjustment by turnbuckle under front floor boards.

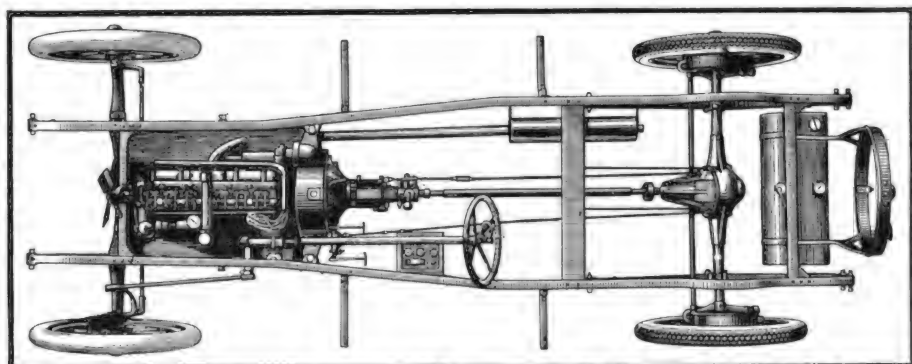
Muffler—Maxim silencer.

Steering Gear—Jacox, irreversible split nut. Simple adjustment. Seventeen-inch notched grip hand wheel, spark and gas quadrant and horn button.

Axle—Full floating. Brown-Lipe-Chapin differential, four pinion type. Gears, 5.5 pitch, $1\frac{1}{16}$ inch face, S. A. E. nickel steel. Drving pinion, 12 teeth; ring gear, 49. Hyatt bearings. Axle and pinion shafts, $1\frac{1}{2}$ inches, S. A. E. nickel chromium steel. Both ends of axle shafts 6-A S. A. E. spline. Pinion shaft mounted on one single and one double row thrust bearing with external adjuster.

Gear Ratios—High, 4.5:1; second, 7.875:1; low, 13.68:1.

Frame— $\frac{3}{16}$ inch pressed steel channel section, S. A. E. carbon steel specification No. 1025.



Plan View of the Malbohm Six Chassis, the Tapering Main Frame, the Power Plant and the Transmission System Being Clearly Shown—Note the Simplified Construction.

in easy reach of natural driving position.

Drive—Hotchkiss; two four-inch universal joints and seamless steel tubular propeller shaft.

Brakes—Foot, external contracting;

Springs—Front, semi-elliptic, 36 by $1\frac{1}{2}$ inches; rear, semi-elliptic, underslung, 49 by $1\frac{1}{2}$ inches, S. A. E. carbon steel.

Wheels—Artillery second growth hickory; 12 $1\frac{1}{2}$ inch spokes front and rear; natural wood finish. Bower bearings.

Rims—Stanweld, straight side, split type.

Tires—32 by $3\frac{1}{2}$ inches S. S., non-skid rear. Goodyear, Fisk or U. S.

Wheelbase—116 inches. Road clearance, $10\frac{1}{2}$ inches.

Weight—Phaeton, 2350 pounds.

Top—One man. Black double texture neverleak drab lining. Two oval nickel plated rear curtain lights. Side curtains swing open with doors.

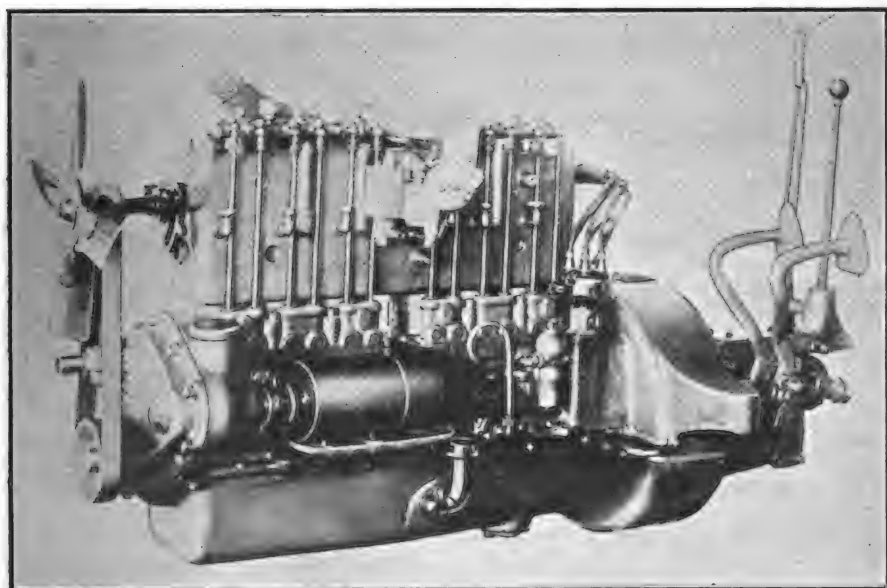
Speedometer—75 mile Stewart-Warner. Gear drive enclosed in transmission case.

Upholstery—Genuine leather. French pleats. Seat backs and cushions shaped over oil-tempered inter-laced steel coil springs. Long napped heavy carpet in tonneau.

Bodies—Malbohm built, seasoned ash and maple; all joints glued and screwed covered with 20 gauge prime sheet steel, welded at seams.

The Phaeton.

Custom coach work has been individualized under the Malbohm trade mark for more than 30 years. The new Malbohm bodies reveal their heritage of the coach builder's art.



Left Side of the Unit Power Plant of the Malbohm Six Chassis, with the Mechanism for the Overhead Valves, the Lighting Generator and the Control Pedals and Levers in Clear View.

The edges are sharply beveled, the cowl merging in an unbroken line with the bonnet to the high radiator.

A storm tilt windshield intersects at a smart angle, back of which the long, low lines of the body continue with the same easy, unbroken sweep. In this lithe clean limbed grace is provided ample room for five people without sacrifice to the new fuselage line characteristic of sport type custom built bodies so much in vogue with smart, breezy people.

Curtains are individually tailored and designed to swing open with the doors. The outside handles are a great convenience in stormy weather. The result is a notable neatness of appearance and a complete assurance of comfort.

The dignity and luxury of the enclosed carriages are combined with the enjoyable features of the open car in the Malbohm touring sedan.

Windows may instantly be lowered or removed and its ready adaptability to any weather condition has a particular appeal to motorists situated in those sec-

tions of the country where the combined advantages of an open car and an enclosed carriage are desirable.

The roof edges and corners are sharply beveled and the top is somewhat lower than other enclosed types. It is provided with a baggage rail for the convenient accommodations of touring luggage.

A smartly inclined double ventilating windshield affords clear vision and protection in stormy weather. A notable point of beauty is the harmonious blending of the exterior lines.

The seating arrangement is for five passengers and the interior appearance reflects the quiet elegance of fine fabrics and distinctive fixtures.

The equipment includes an odorless, effective heating system which can be controlled to maintain an even and comfortable temperature.

The touring sedan is typical of artistry of coach work from the Malbohm work shops.

The Brougham.

This is a single compartment car well

adapted to general usage in good or bad weather.

Professional men, especially physicians, who are obliged to go out in all sorts of weather, will find in this vehicle a rare combination of luxury and usefulness.

A free flowing line defines the contour of the body. Among the many advanced features of design is the straight line roof, beveled edges and exclusive custom appearance.

The smoothness and responsiveness of the valve-in-head engine are admirably suited to the brougham. It is patrician in style and an ideal all around general service car in town and out.

Seating accommodations for four people are provided in the reposeful interior of appealing simplicity.

Tailored upholstery and quiet fittings, an effective heating system, lighting arrangements and other appointments are in the same luxurious style as the touring sedan and in perfect keeping with Malbohm coach work.

ESSENTIALS OF TRACTOR SELLING

By J. A. Everson, Tractor Sales Manager, International Harvester Co. of America.

A STUDY of the qualities which the tractor salesman exercises during the process of getting the order reveals a certain skill, a more or less technical knowledge which he did not require nor frequently use as an implement salesman.

Because the implement salesman, more easily and with less readjustment of point of view, can adapt himself to the sale of tractors, it is probably true that his class is the chief source for recruits to the tractor sales army. He already knows the farmer psychology. He has a distinct conception of the farm atmosphere. He is entirely at home in any discussion about related subjects which bob up during the progress of a sale; in fact, he is well qualified in the very beginning to get into the friendly confidence of the farmer in substantial measure.

But in the sale of implements today he depends for success chiefly upon his ability to present convincingly these three essentials, which count most heavily in the prospect's mind—quality, convenience and the service behind the name. Formerly he preceded such arguments by winning the farmer to feel the necessity of the implement. That is no longer an important step in the sale, because the prospect long ago was sold on the need of having a well assorted standard implement equipment, and consequently does not react favorably to repetition of those fundamentals which he knows already almost as well as he knows his own name. So until the advent of the tractor the salesman to the farmer was permitting these fundamentals to get away from him. He was staking his reputation upon quality, convenience and service.

But since the tractor has grown to be

such a mighty factor in farming operations, the salesman realized he would have to resurrect the fundamental reasons of necessity if he were to be successful in selling tractors. He would have to draw generously on his entire experience, bringing half forgotten facts up to date, and revamping them to fit the tractor's case. In other words, he now found it absolutely necessary, generally first to bring to bear upon his prospect well supported reasons why a tractor would pay on his farm. He also found he would have to do this before he could expect a hearing on the merits of his particular tractor.

Truly, farmers hear much regarding the profitable and other practical benefits of the tractor, and very likely in a large percentage of cases they are persuaded the whole tractor proposition may be good, but as individuals are not sold on the tractor idea as being the necessarily ideal solution of their own particular problems. Because a neighbor has bought a tractor is seldom the balancing argument. So it is at this point that the tractor salesman has the opportunity to bring into play his reasons of necessity, and give vent to the ripe experience within.

The successful tractor salesman has studied diligently to bring his implement experience into concrete expression, to acquire more accuracy in his statements, and a more definite application of facts and figures to each prospect's problems. Therefore, he is prepared to figure out the money value of the tractor—the number of horses it will displace, the value of the feed and pasture thus released, the value of crops that can be raised on those acres and just what part of these savings

will be required to keep the tractor going. This knowledge must be exact and sound that he may hold his own on the farmer's own ground. He presents his reasons of necessity in terms of the prospect's own horses, acres, crops and conditions. In doing so successfully he is traveling in fields strange to the ordinary implement salesman.

But as soon as he has won over the farmer on the necessity of the tractor the salesman reverts to his three cohorts—quality, convenience and service, in order to win a decision for his tractor. From this stage he is back on old familiar ground and can present these three big reasons in their most attractive and persuasive form.

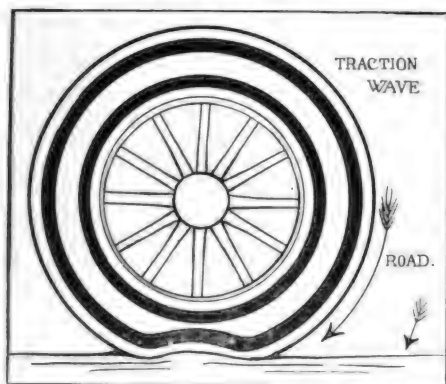
The tractor salesman of today then seems to be broadly developed and to need and use a wonderful capacity for imparting information. He is alive to every issue, posted on every branch of farm administration, crops, live stock, understands the normal operation of every piece of farm equipment and its adaptability, good or poor, to tractor power. He is a past master on the 101 kinds of tractor hitches. He knows the farmer and his ways. He knows the quality, convenience and service arguments for his tractor. All of these he uses expertly as the occasion demands.

HOENTHAL NOW MANAGER AT DETROIT.

The Eisemann Magneto Co. has appointed Elmer H. Hohenthal, who was formerly connected with Bosch Magneto and the Simms Magneto Co., manager of its sales and service branch at Detroit.

Car Operating Economies That Are Practical for Any Driver

Savings Possible When Cars Are Driven with Care



The Action of the "Traction Wave" in the Tread of a Tire, That Causes Friction and Destruction by Separating the Plies If Shoe Is Not Well Inflated.

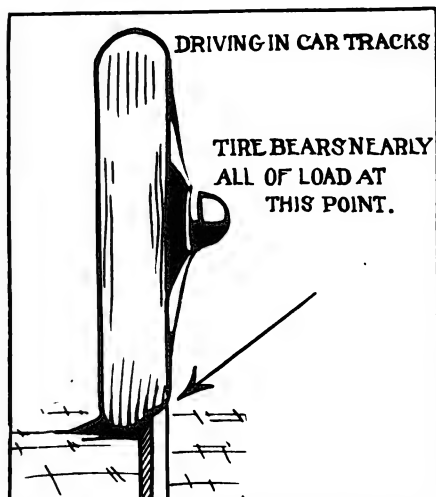
Just because the tire manufacturer has placed a guarantee of 3000 or 5000 miles on his product does not mean that the tire will be worn to a point of unserviceability when that mileage has been reached, providing it has received reasonable care. Though much has been said and written on the subject of inflation pressures for tires, there is no question that one of the greatest causes that make for tire destruction is sufficient pressure to maintain the tire in the form it is designed to have when used, and through the resiliency of the air content resist wear from contact with the highway and from extreme bending stresses. This lack of pressure is generally a fault with most owners and drivers, in many cases where the vehicle has no power air compressor for inflation, and the tires are inflated by guess and not by gauge.

One should remember that every inch of cross section of a tire requires 20 pounds of air pressure. This is an accepted basis for inflation adopted by all tire manufacturers, and the standards for casings of different sizes are usually molded on them conspicuously, so there should be no lack of knowledge as to the pressure that is essential to obtain the largest degree of satisfaction and at the same time the greatest tire economy.

There can be no reason for failure to understand why tires deteriorate rapidly when not fully inflated. As a wheel and its tire revolve there is a constant bending or flexing of the side walls of the tire at the points of contact with the road surface, and that section of the tire contacting with the surface is compressed, the greatest degree in the center and the least at the edges of the area. This compressed area moves as the tire revolves and it is known as the "traction

wave." This wave, of course, will travel as the wheel is revolved, hundreds of times each mile, and it causes an internal movement of the rubber compound that cannot be resisted. The compound must be carefully made and the tire must be well cured to have the degree of resistance that is contemplated by the tire engineer.

The tire, as is generally understood, is composed principally of plies of fabric and rubber compound. The fabric is coated with rubber that is pressed into the voids between the threads and the plies are practically united when the tire is cured. If the tire is fully inflated there is minimum stress upon the fabric, but if not inflated to the pressure intended the stresses are increased. The bending and flexing of the tire is greatly varied, depending entirely upon the weight, the speed and the road conditions, for the shocks from contact with varying obsta-



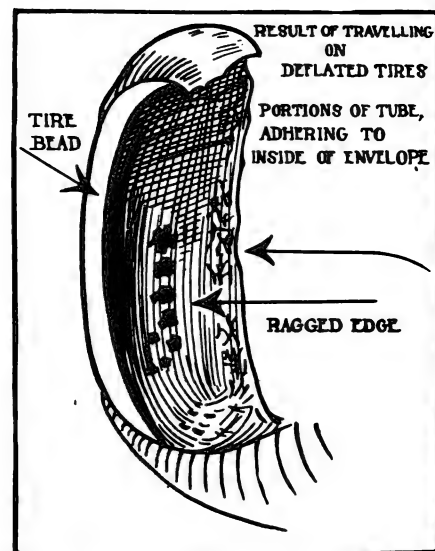
Showing How Tires Are Worn Rapidly by Driving in Car Tracks, the Load Being Borne Principally on One Part of the Tread.

cles will be dependent upon these factors to a very large extent. The tension upon the fabric will be in ratio to the stresses. Assuming that the tire has been well designed and made and is fully inflated, even then the fabric will be constantly flexed, and the result of use is to loosen the threads from the rubber retaining them. If the tire is not inflated to the standard of pressure the stresses upon the fabric and the rubber compound is greatly increased and the result is earlier deterioration. When the tire is kept up to pressure there is distribution of the shocks over the entire structure because the air absorbs a very large part of it and the pressure that is for an instant increased is borne by the entire inner area of the tire. If there is not full inflation the shocks are more localized and the places of contact are more acutely bent. Violent contacts with small road obstacles may result in breaking the fab-

ric or perhaps loosening it from the rubber in which it is anchored in the tire structure.

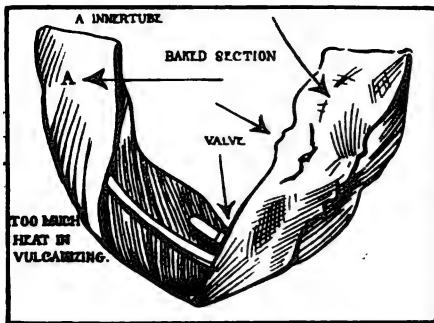
In the event that there is a cut in the tread the variance of pressure upon the tire will cause the cut to open and close with each contact with the road surface. In passing through a puddle of water moisture is drawn into the cut and expelled. The same result happens when sand or dust is driven through, but when these enter the cut they are not as easily expelled and a grinding action is set up that is accentuated with each recurrence of the "traction wave." Eventually the rubber compound is cut through to the fabric and then the fabric will work loose. The tread rubber is the first line of defense and when this is cut through pockets may be formed where the rubber is separated from the fabric, which will retain moisture and sand or dust. These are sometimes known as "sand blisters." There will be quick destruction of the fabric when sand blisters are formed, and ply after ply will loosen until the tire is so weakened that a rupture will result that is known as a "blow-out." A blowout may follow with the inflation pressure much reduced. But the result is the same—a \$30 casing and a \$4 tube gone.

There is no logical reason why one should lose money when air is practically free. Yet the cause may be a leaky valve. Cuts can be repaired quickly and for small expense, even if the work is paid for, and repairing a valve is so trifling that one regards the cost almost as a joke because the cost is so inconsequential. The main cause is neglect—neglect that is so obvious that one cannot fail to establish full responsibility for it.



Condition of a Casing Driven Not Fully Inflated, Both Shoe and Tube Being Ruined by Pressure and Excessive Friction.

When a blowout happens the vehicle should be stopped immediately, first of all to save the tire casing and tube from damage by rim cutting, and to insure against damaging the rim. Unless one is without means of repairing or changing a

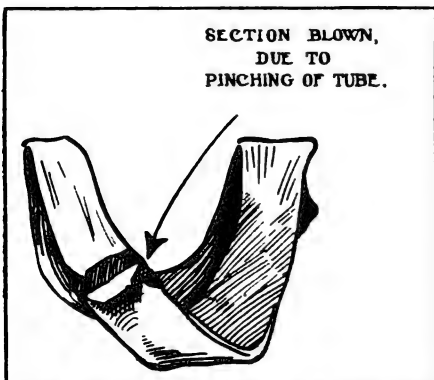


Section of a Tube "Baked" by Amateur Repairer, Who Attempted to Repair Punctures by Vulcanizing, the Heat Being Too Intense.

tire there is no reason why one should drive on a shoe that is deflated. Demountable and quick detachable rims make for quick tire changes. With these and spare shoes that may be carried fully inflated on the machine there is little labor involved in the event of an accident. But if the wheels are not equipped with either of these type of rims and there is need of removing the old shoe, replacing it with another and inflating it, there is nothing gained by failure to driving on the deflated shoe.

The experienced owner or driver will always carry a spare shoe, several spare tubes, and a tire boot or sleeve is very handy and will save time, labor and money. A tire repair kit that consists of cement in tubes, patches, sandpaper, valve parts and several pieces of sheet rubber is always necessary, for with this one can deal with practically any tire failure.

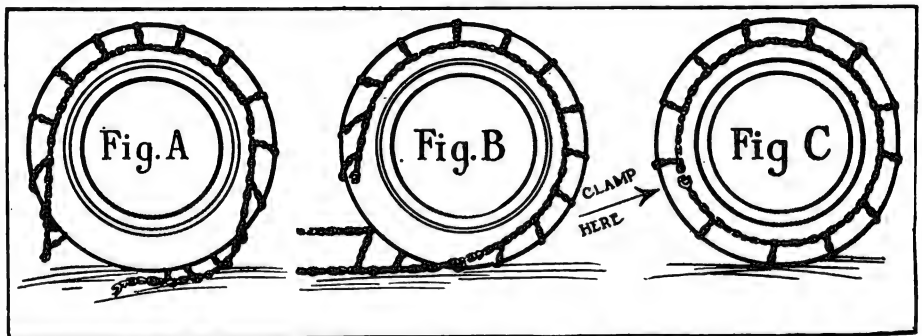
In an emergency, when there is no tube available, the casing may be stuffed with rags, waste, straw and even oats, which will fill it to approximately its normal size and keep its shape to some degree. Then it may be driven to the nearest point, when another shoe may be put on. Those who obtain full mileage from their shoes are comparatively few. The majority of owners and drivers buy two shoes to get the service that should be



Tube Torn by a "Blowout" Resulting from It Being Pinched Between the Rim and Shoe, When Installed by a Careless Worker.

obtained from one, simply because of neglect or abuse.

As a rule the tires are sent out from the factories in such condition that good service can be depended upon. But it cannot be realized unless care is taken to protect them as fully as is practically possible. There is no certainty that the average owner can repair tires by vulcanizing. In the hands of one not experienced a vulcanizer may be the cause of much damage. One may bake a shoe so that it will break quickly, or it may not be fully cured and will lack strength and resistance to wear. For instance, a tube was punctured in two places and the driver, desiring to vulcanize both punctures, had no idea of the temperature necessary to insure a good repair. The vulcanizer was used and the heat applied until the rubber was actually roasted and the elasticity was destroyed in the sections that had been punctured. When the tube was inflated it split at both places where it had been assumedly repaired. This was a result of ignorance. Had the driver known what temperature was necessary the repair could have been made at small expense. As it was a new tube was essential.



The Three Steps of Putting on Tire Chains: Fig. A, the Chain Draped on the Tire; Fig. B, the Wheel Moved Over the Chain; Fig. C, the Chain Closely Wrapped and Ready for Clamping.

It is of the highest importance in fitting a tube in a shoe to have it even within the casing and every crease smoothed. Unless care is taken the tube will be subjected to abnormal strain when inflated, especially where it is creased, and one should be sure that the tube is not pinched by the shoe against the rim. The tube will resist great pressure in the casing if perfectly free, but it will rupture very easily if it is stressed abnormally. An over-sized tire is advisable at all times because of the greater length of service that is obtainable. Car construction, power, speed, lateral and traction strains, load and, most of all, car weight, are determining factors in tire life, which are all provided for in standard makes.

APPLICATION AND CARE OF TIRE CHAINS.

As essential as tire chains are for driving power vehicles safely on ice, snow or mud many owners and drivers are ignorant of the best methods of applying them to wheels and for caring for them to obtain the best results so far as wear is concerned. Little thought is given them until wanted, and usually they are wanted badly. If one does not know how

chains may be applied time and energy and labor is wasted. The accompanying sketch serves to show the three steps necessary to put on chains with the least labor and to have them function correctly. The first step is simply to drape a chain around a wheel. The second is to move the vehicle forward a foot or less, so that the wheel runs over the chain, care being taken in the first to have the chain hang smoothly. This done all that remains is to secure the ends of the chain and the work is finished.

There is no need to jack the machine to have the wheel clear of the ground, though many owners prefer this method. Others spread the chain on the ground ahead of the wheel and push the vehicle ahead and on to it. This requires time and labor and frequently links will cramp so that the ends will not be near enough to clamp and sometimes jacking must finally be resorted to to put on the chains. The chains should always be put on so they will be free to creep around the wheel or tire. If this is done wear will be kept to minimum, but if fitted too tightly the tire would soon become chain cut, especially on the tread, which will mean unnecessary expense.

Chains should not be allowed to rust. When used in wet weather they should be dried after removing and before being placed in the tool box. They should be inspected for wear, too, and if repairs are needed these can be made quickly and easily with a special chain repair tool. The clamps should be closely inspected. A light coat of cup grease or vaseline applied with a paint brush or a piece of waste will prevent rusting and the necessity of using tools to pry the clamps open or close them. Every owner should carry in a tool box one or two extra cross chains, and with the necessary tool one may make replacement on the road, which will save time as well as prevent noise, and chain efficiency will be greatly increased.

ROADSIDE REPAIR OF A TIMER.

A worn timer may be the cause of an engine misfiring, and with a car with a timer that had been a long time in use we started on a journey of about 200 miles. The first 75 miles there was no trouble, but after that the engine began to miss and we stopped and examined the spark plugs to learn if these were the cause. As these were found in good condition (Continued on Page 49.)

Personal News of the Industry in Brief

Frank W. Pilling, well known throughout the middle west, having had long experience as a district manager in that territory, died in Detroit, Oct. 10. He



Frank W. Pilling, Well Known in Motor Car Trade, Dies in Detroit.

was district manager of the Heath-Duplex department of the McCord Manufacturing Co., Inc. Previous to this connection he served the Hupp Motor Car Corporation, Liberty Motor Co. and others.

A. H. Doolittle has joined the Publication Division, Service Department, Bureau of Aircraft, Detroit. He was formerly sales and advertising manager of the Zenith Carburetor Co. of Detroit, and was also at one time connected with the Knox and the Continental Motors Co.

S. V. Norton, manager of truck tire sales of the B. F. Goodrich Co., Akron, O., is one of the men to whom Governor Cox of Ohio has assigned the task of



S. V. Norton, Developing Plan for Motor Truck Transportation.

working out a plan for the development of motor truck transportation.

J. B. Sweeney has become associated with the advertising department of the Firestone Tire and Rubber Co. He was formerly assistant advertising manager of the Paige-Detroit Motor Car Co.

D. B. Groce has been promoted to the management of the truck tire sales department of the Columbus, O., branch of the Firestone Tire and Rubber Co. He was formerly truck and city salesman for the company. William B. Alexander, who has been manager of the Columbus branch, has been promoted to the management of the branch at Omaha.

Charles N. Buchell, prominent in the automobile business, died recently of pneumonia. He was connected with the Buchell Automobile Co., New Bedford, Mass.

Elmer H. Hohenthal, formerly with the Bosch Magneto Co. and Simms Magneto Co., has been appointed manager of the Detroit sales and service branch of the Eisemann Magneto Co.

A. W. Crossman has been made district representative of the Cleveland Tractor Co., with headquarters at Los Angeles, Cal. The territory under his supervision consists of California, Washington, Oregon, Arizona, Utah, Nevada and Idaho.

R. C. Greth, for the past two years engaged in the sale of motor cars at Phoenix, Ariz., and prior to that associated with the Overland and Hudson companies as special representative, has been appointed district representative of the Cleveland Tractor Co. in the Oklahoma territory.

Andrew Kirkpatrick has accepted a commission in the Motor Transport Corps and is stationed at Baltimore. He was formerly vice president and secretary of the L. V. Fletcher & Co., New York.

C. L. Williams is now at the Kansas City branch of the Hassler Shock Absorber. He was formerly located at the St. Louis, Mo., branch. E. L. Hudson has been made manager of the St. Louis branch of the company.

Earl L. Woods has accepted a commission as a captain in the Motor Transport Corps and will shortly go over seas with Unit 304. He was sales manager of the tractor department of the J. I. Case Plow Co., Racine, Wis.

F. N. Morgan has become associated with the Cleveland Tractor Co. in the capacity of district manager. He has been given charge of the southwestern territory, with offices in Oklahoma City. Mr. Morgan was formerly assistant manager of the St. Louis branch of the Studebaker Corporation.

H. L. Hall has been appointed Chicago branch manager of the Swinehart Tire and Rubber Co. For the past eight years he had charge of the western territory for the Troy Carriage Sunshade Co., Troy, O. Mr. Hall has been connected with the automobile industry since its bicycle infancy.

Charles S. Pike is entering the Motor Transport Corps, candidate for a commission as captain. He was recently placed in charge of merchandising of



Charles S. Pike of Paige-Detroit Company, Enters Motor Transport Corps.

motor trucks to be built by the Paige-Detroit Motor Car Co.

E. H. Geyer is now general sales manager of the Hercules Motor and Manufacturing Co., Canton, O.

A. F. Knobloch has been appointed to an important position in the Ordnance Department as assistant to Louis J. Horowitz, recently appointed special assistant to the chief of ordnance in charge of tanks. Mr. Knobloch will act as Mr. Horowitz's special representative in matters having to do with practical manufacturing and technical details in providing the fighting tanks required in Europe. He was formerly vice president and works manager of the Cleveland Tractor Co.



A. F. Knobloch, Appointed to Position in U. S. Ordnance Department.



C. C. Winningham, Appointed to Service in U. S. Department of Labor.

C. C. Winningham, who was formerly advertising manager of the Hudson Motor Car Co. of Detroit, has been made associate chief of the Industrial Plants Division, Information and Education Service of the United States Department of Labor. Previous to that connection Mr. Winningham was chief of the Gasoline Section of the United States Fuel Administration.

Albert Gough, who was formerly connected with the Shaw Electric Crane Co., Muskegon, where he was engaged in production work, is now in charge of the service department of the Liberty Motor Car Co., Detroit.

George C. Gordon has been re-elected president of the Selden Truck Sales Co., Rochester, N. Y. The other officers are: William C. Barry, first vice president; R. H. Salmons, second vice president; H. T. Boulden, third vice president, and R. E. Reynolds, fourth vice president; E. B. Osborn, secretary; F. J. Kolb, treasurer.



George C. Gordon, Re-Elected President, Selden Motor Truck Sales Co., Rochester, N. Y.

C. W. Hollaway is now district manager of the Cleveland Tractor Co., Cleveland, O. He will be located in the Healey building, Atlanta, Ga. His territory comprises Georgia, Alabama, Florida, North and South Carolina and Tennessee east of the Tennessee river.

J. Fred Holland has succeeded Ralph H. Ratliff as sales and advertising manager of the Rutler Manufacturing Co., Indianapolis, Ind. Mr. Ratliff resigned to take up agriculture.

L. H. Boydston, formerly director of sales for the Sandow Motor Truck Co., Chicago, Ill., has become associated with the Service Motor Truck Co., Wabash, Ind., and will assume the duties of district sales manager in the territory comprising Wisconsin, Minnesota, Iowa, North and South Dakota and Nebraska. Mr. Boydston succeeds Frank Drage, who formerly covered that territory for the Service company.

J. S. Burdick, who for the past year has been body engineer at the plant of the Locomobile Company of America, in charge of model body designing construction, has enlisted in government work for overseas service as automotive engineer in connection with fuselage in aircraft construction.

Walter E. Parker has entered the United States army as captain in the quartermaster's division. He was formerly president of the Commerce Motor Car Co. of Detroit.

Miss Nellie D. Prendergast, for a number of years advertising manager of the Pathfinder Co. of Indianapolis, who is nationally known on account of the many publicity campaigns she conducted at the automobile shows in the various cities, has been appointed manager of the motor truck and advertising departments of the Kaufmann-Morris Co., New York City, dealers in Nash passenger cars and trucks and the Titan line of trucks and Premier passenger cars. For the past year Miss Prendergast has been advertising manager of the Bancraft-White Corporation of Syracuse, N. Y.

E. D. Hawley has been promoted to manager of the Studebaker branches in Ohio, Pennsylvania, West Virginia and New York. He was formerly connected with the Columbus, O., branch of the Studebaker Sales Co.

Fred C. Meinhardt has been appointed office manager of the Milwaukee Auto Engine and Supply Co. He was formerly auditor of the United States engineers office at Milwaukee. Through a typographical error in these columns it was originally announced that Mr. Meinhardt had been appointed business manager of the company.

Captain Edward V. Rickenbacher, formerly a leading race car pilot on the American tracks has been awarded two more bronze oak leaves for extraordinary heroism, to be worn on the Distinguished Service Cross awarded him on Oct. 16.

David C. Fenner has been appointed an assistant to C. C. Hanch, chief of the Automotive Products Section of the War Industries Board. He is a member of the Highways Transport Committee of the New York State Council of Defense.



Capt. E. V. Rickenbacher is Again Decorated for Heroism.

O. E. Harmon has been appointed manager of the service department of the Fuller & Sons Manufacturing Co., Kalamazoo, Mich. This company also announces the appointment of M. E. Fuller as employment supervisor in the employment department which was organized under the direction of Dr. Blackfor, an international employment expert.

Leslie R. Acton, president of the Power Truck and Tractor Co., Detroit, Mich., which was recently organized with capital of \$2,500,000, and which has already begun manufacture of four sizes of power truck chassis, is well known in the motor industry, having been associated with several of the best known manufacturers in the country. He was at different times auditor and assistant treasurer of the Studebaker Corporation, production manager of the Maxwell Motor Co. and vice president of the Redden Motor Truck Co.



Leslie B. Acton, President of the Power Truck and Tractor Co., Detroit.

Future of the Tractor Industry

Demand Will Equal Production—Great and Quick Growth Certain—Makers and Dealers Can Avoid Failures Met in Producing and Selling Automobile Vehicles—From an Investment Viewpoint Good Products and Good Management Should Warrant Substantial Returns.

(REPRINTED FROM TRACTOR WORLD)

FARM tractor manufacture has been approved by the War Industries Board as an essential industry. Those engaged in it have assurance of priority in distribution of fuel and materials and will be allowed whatever labor is needed to meet the production demand.

not be over productive. There are wonderful prospects for the concerns that are well established and can produce machines. There is no reason to believe that there will be speculation in tractors, because they are only useful for farm and industrial operations. But the present

stantial numbers, and still others are engaged in experimental and development work preparatory to active production. Several companies are now producing machines to fill government contracts and for this reason cannot accept commercial orders. No one can with any degree of certainty predict what the output of any one concern will be. Because of this fact there may be supposition that any tractor manufacturing company ought to be reasonably profitable, and that investment in stock of a company with "good prospects" ought to be productive of substantial dividends.

Prosperity May Attract Swindlers.

While there is every reason for TRACTOR WORLD to encourage legitimate business and promote the industry and the interests of those engaged in it, there is equal need of pointing out that so far as possible the people should be protected against the operations of swindlers who, with a state charter and desk room, may dispose of worthless stock principally upon the representation that there shall be large returns upon the amounts invested. Getting rich quickly, no matter what the risk, appears to appeal to all classes alike.

Statement may be made that infliction of extreme penalty for swindling will not bring about restitution of money lost. Generally speaking, those who suffer through fraudulent operations are those who can ill afford to lose. Those who have knowledge of business are seldom misled by prospects of acquiring wealth from uncertain sources. Investment in tractor and farm implement manufacturing concerns that are operating and are



Bull Tractor Threshing Beans, Owned by D. J. McMurty, Arroyo Grande, San Luis, Obispo County, Cal., Contracting Bean Thresher.

Tractors are needed by thousands in this country, and any surplus of domestic requirements can be absorbed by other nations. The need for food crops will be quite as great the coming year and the shortage of labor will be far more keenly realized. There is reason to believe that the experience of farmers with tractors this year will create a demand for machines that will be largely in excess of the production.

This does not mean that the tractor manufacturers will willingly limit their outputs, but certain it is that labor will be extremely scarce, and even with impartial apportioning of help that shall be available there is no prospect that more than a part of the number required can be obtained by any industry. There are some industries that must have outputs to standard, such as steel and fuel production; the farmers must raise the largest food crops in the history of the land, the railroads must be operated, war munitions must be turned out in whatever volume is required, and the ship yards must launch more vessels than ever before. But all else will be limited, perhaps by conditions, perhaps by governmental regulation.

No Prospect of Over-Production.

These facts have been referred to merely to convince those who may have interest that the farm tractor industry will

activity and prosperity of the industry may afford camouflage for flotation of stock of companies existing only on paper, and organized for the purpose of relieving the general public of whatever cash it may be induced to part with.

There are today about 225 concerns listed as builders of farm tractors. A number of these are very large and have investments representing millions in each instance. Many others are well established and are building machines in sub-



Plowing a Big Field Quickly: Team of Three Bates Steel Mules, Model 10-20, Working with Gange of Two 14-Inch Bottom Plows in eHeavy Land.

reputable ought to be as safe as any other industrial or commercial enterprise.

New Concerns Must Be Approved.

Today any concern promoted to engage in business, if of proportions, must have the approval of the Capital Issues Committee, a body of seven men, all of them bankers, and with one or two exceptions men of legal training, that is located in Washington. This committee is headed by Charles S. Hamlin of Boston, a lawyer, who was assistant treasurer of the United States, and it has been created by authority vested in President Wilson, who approved of the personnel of the body. The duty of the committee is to consider and approve or disapprove any proposition involving the investment of capital, so that there shall not be unwise uses made of the financial resources of the nation.

The committee has no fixed procedure. It has the power to deal with each proposition that shall come before it according to the judgment of the members, and there are no precedents or restrictions by which its authority can be evaded. It has almost unlimited power and jurisdiction, and it can rely upon the earnest support of banks and bankers, reputable business men and all others who are con-



An I-H-C Titan Tractor Hauling Two McCormick Seven-Foot Binders, the Operator on the Rear Machine Handling Both and Observing the Work.

prosperity. There is also a danger of reason to expect an unusual degree of well intentioned men organizing companies that have not sufficient capital with which to operate, and being forced by circumstances to discontinue after considerable losses have been experienced.

Reverses in Automotive Industry.

There is undoubted belief by the pub-

lic who believed they were justified in expecting substantial returns.

To better understand this, statement may be made that from the beginning of 1912 approximately 800 different concerns organized to manufacture automobiles and trucks have failed or suspended operations entirely. Some of these were very large and had adequate resources, but the probability of returns was so remote that there was no reason to continue. During the past two years about 200 of these companies have ceased to exist, the majority of them voluntarily or involuntarily abandoning all activity. One of the best evidences of the very large number of reverses is the fact that a single concern is now making parts for upwards of 165 different makes of cars and trucks that are not now built.

Business Failures Very Numerous.

This statement does not include thousands of individuals and companies, operating as agents for manufacturers, that began business with seemingly bright prospects and have failed or have been liquidated. Were one to weigh the losses against the profits made by the automotive industry and trade there would probably be found an astounding total of losses and a surprisingly small aggregate of gain. Yet the concerns now operating are regarded as business successes, and some of them have made very large profits.

A very large proportion of the failures of the automotive trade has been due to lack of experience and willingness of



Reaping the 1918 Hay Harvest, Italy, with a Titan 10-20 Tractor That Drew from Four to Five Mowing Machines.

cerned in discouraging enterprises that are non-essential, or suppressing those that are not legitimate and can bear full-est investigation.

Old Concerns Must Stand on Merits.

There can be assurance that if a new concern has the approval of this committee it will be reasonably safe to invest in. But, of course, this committee has not and will not pass upon concerns that existed before it was created, so there is the need of careful discrimination by the buyer of a stock to determine the character and reputation, as well as the financial responsibility of the concern in which investment is proposed. There is, unfortunately for the investor, no measure by which the value of stock or other industrial or commercial security can be determined. Any appraisal must be based upon the actual business transactions covering a definite period.

The farm implement and tractor industries have been comparatively free from the operations of swindlers, due, no doubt, to the fact that there had not been

lic that the automotive industries has been enormously successful, principally from the fact that automobiles are so generally used, but a cursory examination of facts will demonstrate that as a rule there have been many more failures than successes, and in many instances heavy loss has been suffered by invest-



Gray Tractor Hauling Two Eight-Foot Packers and a 23-Foot Harrow, This Being a Practical and Quick Way of Cultivating.

agents to accept used vehicles of uncertain value and varying amounts of cash in payment for new machines. There is undoubtedly large shrinkage in all "trade" or exchange transactions, and capital is very quickly absorbed by accumulations of cars and trucks that are worth but very little at forced sale. There is no reason to believe that tractor dealers will sell machines as automobile and truck dealers have, taking used and worn tractors in exchange. One might point out that "trade" sales are not profitable unless there can be a fixed value of the property taken in exchange, which is obviously not possible.

"Trade" Sales Lead to Disaster.

There is one basis for sales of new tractors to owners who want to dispose of used machines, and that is to sell the old tractor for either a fixed price or for the best offer, and charge the full amount for the new. This would even then be a reduction of profit unless a commission was obtained for the sale of the used machine, for more time and endeavor would be necessary to dispose of it than to sell a new tractor. The tractor dealer cannot expect to do business unless he makes a reasonable profit on his stock, and he cannot afford to carry large investments of capital in machines that have no known value.

The prices of the tractors are established by the manufacturers f. o. b. factories or branches and to these must be added the freights, which will vary with the distances shipped, so that the dealer has his maximum price, and he makes stated percentage of this, so that rebates, concessions, trade allowances and other shrinkage must necessarily be taken from the profits. The cost of transportation is a factor of considerable importance in price, and today the majority of tractors are built in the Middle West, Northwest and the Pacific coast, the manufacturers locating their works as near as is practical to the sources of material and fuel supply and yet be comparatively close to the largest market.

The tractor trade cannot logically be located in principal cities unless these are the commercial centers of large areas, and as a matter of fact dealers in smaller towns have a decided advantage if they are well known. Generally speaking the tractor agent who shall be most successful will be in sections of the country where the farming operations are large and the farms of considerable size. There will no doubt be some demand for machines from small operators, but not in the same measure that will be realized from those who produce large crops and have increasing need of power machinery.

During August the Detroit district exported automobiles and parts valued at \$1,232,887, and agricultural implements valued at \$107,325. The total value of exports from the district for the month was \$28,668,564.

The Hudson Motor Co., Detroit, is to erect a one-story building, to be used for a repair shop and for storage, at its plant in that city at a cost of about \$45,000.

Servis Recorder's Chart Shows All Truck Moves

A time recording device for power trucks, just developed, which is entirely new in its principle of operation and is claimed to be proven for accuracy and certainty of record, has been perfected by the Service Recorder Co., Cleveland. It is a development from the time and distance recording instruments produced by this concern, some of which have been in use for several years.

The device is known as a Servis Recorder and it is not connected with any

merely carried aboard the truck.

In operation it is actuated by the side sway, which is always created when any vehicle is in motion—even in a Pullman car running on smooth tracks. The side sway causes a pendulum to oscillate and the pendulum is fitted with a steel stylus or marker which marks a travel path on a waxed chart that revolves once every 24 hours. In simple terms, therefore, the Servis Recorder is a clock which turns a chart and a pendulum (not connected with the clock, but separate from it), which by means of a steel point marks a travel path upon the chart.

After the day's run the chart is taken by the owner, superintendent, traffic manager, dispatcher, or whoever has charge of trucks, and he, by comparing the chart with the trips for the day can see, as shown in the example below, just

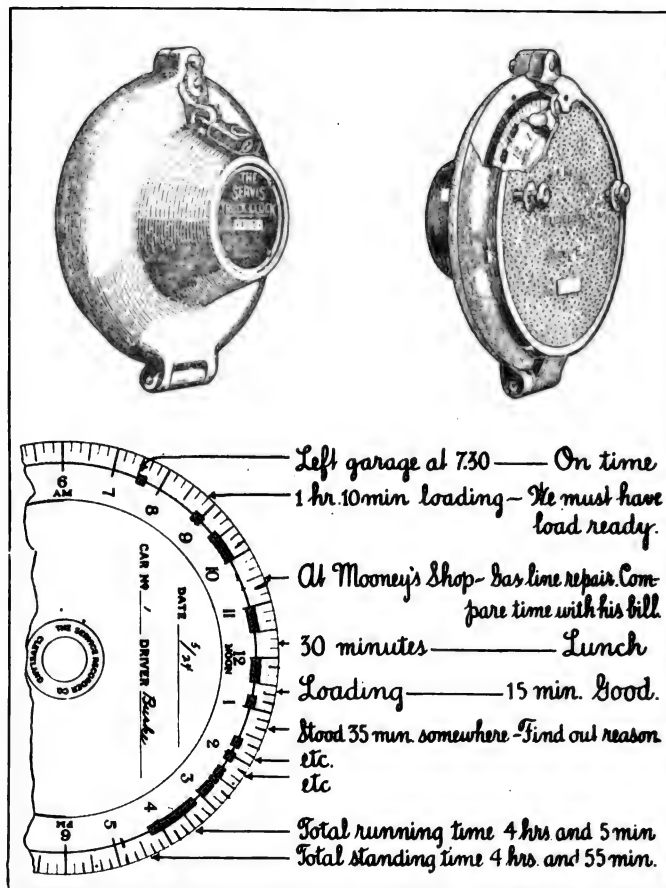
where to begin to cut down the idle time and to increase the productive time of the truck. A simple totaling device is furnished, which quickly totals from the chart the exact running and standing time for the whole or any part of the day.

Another feature emphasizing the simplicity of the new Servis Recorder is the fact that it requires practically no attention. It has no pencil or pen to renew or adjust and not even a clock winding key to bother with. It is merely necessary to change the charts daily and wind. Not only is it fool proof, but it is tamper proof as well, for the working parts are completely enclosed in a strong metal case and padlocked.

It is believed that in eliminating all attachments to the running parts of the

truck, such as gears, rods, shafts, etc., the big obstacle to the success of time recording devices for motor trucks has been overcome. The present instrument is simpler in many ways than a speedometer and the information it gives is of vital importance to the man responsible for the showing that the motor truck makes.

The plant of the States Motor Car Co., formerly operated by the Michigan Buggy Co., at Kalamazoo, Mich., has been purchased by the Barley Motor Co., which has a prospect of a large government truck contract. The plant has more than 350,000 square feet of floor space.



The Servis Recorder, a Newly Developed Instrument for Indicating All Truck Movements, and a Section of Chart and Note of Indication.

of the operating parts of the truck. It will indicate the time of starting and each stop, the duration of the stop and when start was again made, so that the record is complete so far as movement of the truck is concerned. The instrument is sold for \$28, which is much less than the prices for which similar devices have heretofore been valued.

The Servis Recorder consists essentially of a specially constructed clock movement that is, with a marker or indicator and a chart entirely enclosed in a heavy metal case. There is no outside connection, but the device may be bolted to the truck chassis or body in any one of a dozen convenient places, and, in fact, it would indicate if it were

TO JOURNAL SUBSCRIBERS

In the following pages you will find listed, priced and described, a large number of articles that are used generally by vehicle owners. With hardly an exception jobbers and dealers can supply any of the parts, fittings, accessories, equipment, machinery, or tools dealt with.

The first installment of similar articles was published in the October issue of the Automobile Journal. In the following numbers of this magazine many hundreds of these descriptions will be published and this great feature will be continued until practically all standard lines produced will be described.

In connection with the last installment a complete index will be published, giving issue and page number of the journal in which the articles and description was published. If prices or delivery conditions change in the meantime corrections will be made in the final index.

By retaining all numbers subscribers will have the most complete catalogue of desirable car equipment ever issued. It will have all the good features of a trade directory, a buyer's guide and a trade reference book.

Owing to new publishing requirements back copies of the Journal can not be supplied and we earnestly request all subscribers to file and retain copies.

IN THE DECEMBER NUMBER OF THIS MAGAZINE 200 ARTICLES WILL BE DEALT WITH AND SPECIAL ATTENTION WILL BE GIVEN TO EQUIPMENT THAT WILL ADD TO THE CONVENIENCE AND COMFORT IN THE USE OF CARS DURING THE WINTER SEASON.

Owing to the uncertainty in securing material to this time it has been almost impossible for many manufacturers to be specific in stating delivery dates. By referring to articles you will find stated at the end of practically all descriptions the delivery conditions. When that detail is not mentioned it is assumed that any reasonable demand can be taken care of promptly.

Directory of Automobile Accessories Parts and Supplies, With Descriptions, Illustrations and Prices

This is the second part of the directory of accessories, parts, fittings, machinery, tools, equipment and supplies which is being published in the Automobile Journal and Accessory and Garage Journal. Articles that are now in production or which are being carried in stock and that can be secured by jobbers and dealers are described and illustrated, and the prices and delivery conditions are stated.

Acme Automobile Jack—I. S. Spencer Sons, Inc., Guilford, Conn.....37
A. C. Carbon-Proof Spark Plug—Champion Ignition Co., Flint, Mich.....33
Adamson Model E Vulcanizing Set—Adamson Manufacturing Co., East Pal-

estine, O.....30
Advance White Stripe Transmission Lining—Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago, Ill.....37
A. & H. Valve Tool—A. & H. Manufac-

turing Co., Inc., 505-507 West 45th St., New York, N. Y.....27
Akron Williams Rag Roller—Williams Foundry and Machine Co., Akron, O...34
Aloxite Cloth—Carborundum Co., Niagara Falls, N. Y.....35

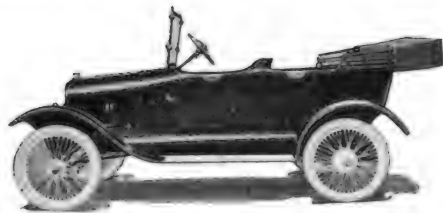
goods, it is to be assumed that the same situation would exist as under normal conditions and that the article would be procurable, subject to the transportation and manufacturing considerations of the present time.

Owing to present publishing conditions, extra copies cannot be supplied, so subscription orders should be placed at once.

turing Co., Inc., 505-507 West 45th St., New York, N. Y.....27
Akron Williams Rag Roller—Williams Foundry and Machine Co., Akron, O...34
Aloxite Cloth—Carborundum Co., Niagara Falls, N. Y.....35

- American Bureau of Engineering**—American Bureau of Engineering, 1018 Wabash Ave., Chicago, Ill. 37
- American Folding Camp Stove**—American Gas Machine Co., Albert Lea, Minn. 35
- Ambu Plate Press**—American Bureau of Engineering, Chicago, Ill. 33
- Auto-Scope Windshield Wiper**—White Lock Co., 1241 Michigan Ave., Chicago, Ill. 36
- Bay State Autokit Wrenches**—Bay State Pump Co., Boston, Mass. 25
- Beach Automatic Grip Puller**—The Greb Co., 202 State St., Boston, Mass. 33
- Black & Decker Tank and Pump**—Black & Decker, Baltimore, Md. 25
- Black & Decker Tire Inflator Outfit**—Black & Decker Mfg. Co., 304 Water St., Baltimore, Md. 27
- Blaxshine**—Twin City Varnish Co., 268 N. Wabash Ave., Chicago, Ill. 34
- Brake Shoes for Fords**—Adamson Mfg. Co., East Palestine, O. 25
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- Copley Primer**—Bay State Pump Co., 100 Purchase St., Boston, Mass. 23
- Culver-Stearns Giant Searchlight**—Culver-Stearns Mfg. Co., Worcester, Mass. 27
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- De Luxe H. 34 U. S. Two-Stage Automatic Air Compressor**—United States Air Compressor Co., Cleveland, O. 28
- Durf Spark Plug**—Durf Manufacturing Co., Gerken building, 90 W. Broadway, corner Chambers St., New York City. 23
- Eagle Motor Oils and Gear Oil**—Eagle Oil and Supply Co., 44-5-6 India St., Boston, Mass. 36
- Eclipse Valve Grinder**—Eclipse Valve Grinder Co., 1230 Lydia Ave., Kansas City, Mo. 27
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- Egry Register System**—Egry Register Co., 431 Monument Ave., Dayton, O. 23
- Ever Last Resole**—Ever Last Tread Co., Inc., Indianapolis, Ind. 23
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- Gates Vulco-Cord Belt**—Colorado Tire and Leather Co., Denver, Col. 32
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- Imperial Primer**—Imperial Brass Manufacturing Co., 1200 West Harrison St., Chicago, Ill. 23
- Kennedy Auto Covers**—Kennedy Car Liner and Bag Co., Shelbyville, Ind. 32
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- "New Britain" All-Steel Bench Drawer**—New Britain Machine Co., New Britain, Conn. 36
- New Era "Better" Strapless Tire Holder**—New Era Spring and Specialty Co., Grand Rapids, Mich. 35
- Never-Leak Gaskets**—Fitzgerald Mfg. Co., Torrington, Conn. 38
- Outlook Cleaner**—Outlook Co., 5525 Euclid Ave., Cleveland, O. 28
- Pierce Governor**—Pierce Governor Co., Anderson, Ind. 26
- Premier "Its-It" Vulcanizer**—Premier Electric Co., 4632-4042 Ravenswood Ave., Chicago, Ill. 34
- Premier "Stick-Lite"**—Premier Electric Co., 4032-4042 Ravenswood Ave., Chicago, Ill. 21
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- Red Spot Searchlight**—F. W. Wakefield Brass Co., Vermillion, O. 28
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- "Ritemix" Gasoline Economizer and Compensator**—Perfection Auto Parts Co., 2130 Superior Ave., N. E., Cleveland, O. 23
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- Shurnuff Windshield Ventilator**—Shurnuff Manufacturing Co., St. Louis, Mo. 28
- Simplex Grease Gun**—Hinrichs Manufacturing Co., Chicago, Ill. 38
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- Sprague Worm Steering Gear**—Sprague Manufacturing Co., Omaha, Neb. 24
- S. R. B. Stanford Bearings**—Standard Roller Bearing Co., Philadelphia, Pa. 24
- Stewart Handy Worker**—Chicago Flexible Shaft Co., 12th St. and Central Ave., Chicago, Ill. 23
- Stewart Foot Accelerator**—F. W. Stewart, 1402 Michigan Ave., Chicago, Ill. 38
- Stickit**—Bay State Pump Co., Boston, Mass. 31
- Storm Light Weight Pistons**—Storm Manufacturing Co., Thompson, Ia. 35
- Storm Connecting Rod Bearing Reamer**—Jig and Straightening Gauge—Storm Manufacturing Co., Thompson, Ia. 31
- Sunderman Vacuum Carburetor**—Sunderman Corporation, 9-11 Chambers St., Newburgh, N. Y. 22
- Superior Parts**—Specialty Manufacturing Co., 636 Massachusetts Ave., Arlington, Mass. 32
- Superior Drop Forged Wrenches**—J. H. Williams & Co., Brooklyn, N. Y. 29
- Su-Dig Series Plug**—Superior Motor Power Co., 135 Fifth Ave., New York City. 28
- Taples Foot Warmer**—Taples Corporation, 47 West 34th St., New York City 36
- Tip-Top Ti-Re-Par Vulcanizing Outfit**—Akron Rubber Mold and Machine Co., 941-5 Sweetzer Ave., Akron, O. 27
- Tri-Co Rain Rubber**—Tri Continental Corporation, Buffalo, N. Y. 31
- "Triple" Gasoline Hose**—Metal Hose and Tubing Co., Brooklyn N. Y. 37
- "Universal" Adjustable Hose Clamps**—Universal Industrial Corporation, Hackensack, N. J. 25
- Universal Battery Service**—Universal Battery Co., 3420 S. La Salle St., Chicago, Ill. 22
- Universal Screw Cabinet**—Hobart Brothers Co., Troy, O. 26
- Universal Vise Attachments**—The Universal Equalizer Co., Cincinnati, O. 24
- Utility Varnish Renovator**—Poughkeepsie Utilities Corporation, 36 Winnikee Ave., Poughkeepsie, N. Y. 32
- Victor Heater for Ford Cars**—Foreign and Domestic Auto Supply Co., 1765 Broadway, New York City. 22
- Wagoner Engine Cleaner**—Wagoner Specialty Co., 1902 Broadway, New York City. 28
- Water Spray Auto Brush**—Scully-Jones Co., Chicago, Ill. 31
- Water Gas Carburetor**—Water Gas Carburetor Co., 347 Fifth Ave., New York City, and 1504 Grand Ave., Kansas City, Mo. 22
- Weston Garage Testing Instrument**—Weston Electrical Instrument Co., 103 Weston Ave., Newark, N. J. 31
- Williams Solid Reducing Shell**—Williams Foundry and Machine Co., Akron, O. 38
- Woodworth Carbon-Clear**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 34
- Woodworth Easyon Chains**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 31
- Woodworth Easyon Truck Chains**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 32
- Woodworth Fan Belts for Fords**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 29
- Woodworth Hook-On, Strap and Lace Tire Boots**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 30
- Woodworth Kant-Skid Cross Chains**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 35
- Woodworth Lock Chains**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 37
- Woodworth Lubricating Spring Covers**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 29
- Woodworth Steel Treads**—Woodworth Manufacturing Corporation, Niagara Falls, N. Y. 33
- Yankee Vise, No. 1993**—North Brothers Manufacturing Co., Philadelphia, Pa. 33

"Amesbilt" Five-Passenger Ford Bodies have every detail and quality known to the master builder. The makers claim that the same workmanship, quality and class of material that go into the high-priced motor car built "Amesbilt" bodies are used in these Ford bodies. The seats are tilted to invite relaxation. The cushions are fitted with deep coil springs of the proper resistance to absorb road shocks and the body sets low and has

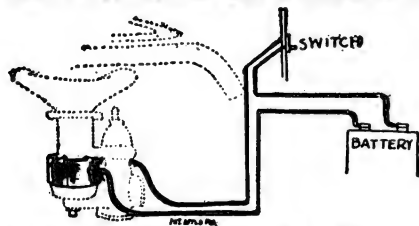


"Amesbilt" Five-Passenger Ford Body.

pure stream lines. The inside measurement from dash to back of front seat is 42 inches. Depth of cushions 17 inches. Front seat 36 inches wide. Back of front seat to back of rear seat 39 inches. Depth of rear cushion 20 inches. Overall length 122½ inches. These bodies are made in a variety of styles at attractive prices.

Manufactured by the F. A. Ames Co., Inc., Owensboro, Ky. Write for prices and literature.

The Line Carburetor Heater applies the heat direct to the float chamber, raising the temperature of the gasoline so that when it passes into the intake manifold it vaporizes readily even though the engine is cold. The device is so designed that it can be wrapped about the carburetor float chamber and is connected by



two wires which run through a switch to a six-volt battery. When the switch is closed the heat generated by the resistance coil in the device heats the gasoline in the carburetor chamber.

Manufactured by the Mechanical Utilities Corporation, North La Salle St., Chicago, Ill. Price, \$4.

The Victor Heater for Ford Cars is one of the best known on the market, being handled by some 260 jobbers and being used on 210,000 cars according to the makers. It utilizes the intense heat from the exhaust gases to heat fresh air that is radiated inside the car and becomes effective a few seconds after the engine has been started. Following in design the same time-tested principle as in the construction of the hot air furnace, it circulates fresh air over a heated drum. This drum runs lengthwise, at right angles to the exhaust pipe. The exhaust coming

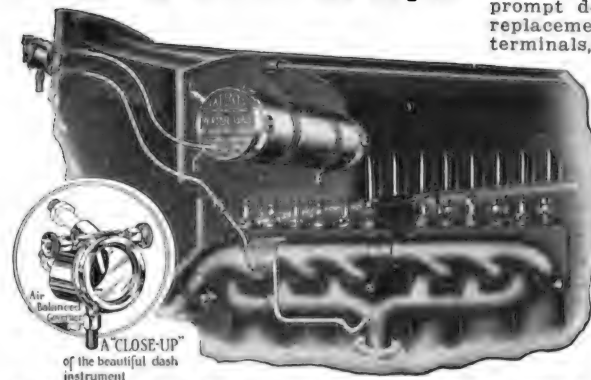


direct from the motor is turned into the drum. Fresh air circulates around the outside of the drum and is heated by the hot gases inside and rises into the car. A cone shaped spring in the drum absorbs the force of the exhaust, acts as a silencer

and at the same time radiates heat outward toward the heating surface. It has no complicated parts, nothing to get out of order, costs nothing to operate and is an ornamental fixture rather than an eye sore when installed. Anyone can attach the heater in 20 minutes' time and new floor boards are furnished to eliminate the necessity of sawing or patching. Prompt deliveries.

Distributed by the Foreign and Domestic Auto Supply Co., 1765 Broadway, New York City. Price, \$5.

The Water Gas Carburetor is an outfit for introducing moisture into the engine cylinders with the combustion charge as a means of producing the same ideal mixture as obtains in damp or foggy weather, at which times, as has been the experience of every motorist, the engine shows exceptional efficiency and power. This fact has been known for some time, as it was known that additional amounts of oxygen with the gasoline mixture not only made a more powerful charge, but resulted in almost complete combustion, practically eliminates carbon formations and all the troubles of which they were the cause. With these facts in mind the only problem to solve was that of perfecting a device with which the amount of water introduced into the firing charge could be carefully regulated and the Water Gas Carburetor was designed



to accomplish this purpose. This outfit consists of a copper tank with brackets for installation, 10 feet of copper tubing with fittings and the carburetor. Suction from the intake manifold draws filtered water from the tank into the Water Gas Carburetor, which is a double jet sight feed instrument. Controlled automatically to correct speed by an air balanced governor, the water is fed, drop by drop, through the copper tube into a coil wrapped around the hot exhaust pipe, where it becomes converted into steam and is then sucked into the cylinders through the manifold with the firing charge, assisting complete vaporization by raising the temperature, increasing the combustibility of the mixture and thereby greatly increasing the amount of power developed from a given amount of gasoline.

Manufactured by the Water Gas Carburetor Co., 347 Fifth Ave., New York City, and 1504 Grand Ave., Kansas City, Mo. Price of outfit complete, \$18.

The Sunderman Vacuum Carburetor is built on the high vacuum principle which, as is known, greatly increases the evaporation and gasification of liquids. The nozzles or jets in the Sunderman are placed at 90 degrees angle to the air intake. They are tapered to 45 degrees and as the air passes over the nozzles with a 45 degree taper head, it has a tendency to create a vacuum over the opening of the nozzles. As the air strikes the tapered circumference of the nozzle heads, this creates a fan shape flow, instantly breaking the fuel into mist, so that it is readily converted into gas, aided by the high vacuum in the body of the carburetor.

The makers claim that combustion in the cylinders is so rapid that only the sur-



face of the minute fuel globules burn to furnish power and that the rest is wasted in the exhaust. Also, that in view of this fact the surface of a given volume of small globules, as furnished by the Sunderman, is greater than the surface of the same volume of liquid globules due to low vacuum, therefore the power developed from small globules is greater than from large ones, giving increased power, mileage and general efficiency.

Manufactured by the Sunderman Corporation, 9-11 Chambers St., Newburgh, N. Y. Write for prices and literature.

Universal Battery Service is a perfect, complete service for repairs on practically any battery. This service solves one of the biggest problems, as it guarantees prompt delivery on all parts needed for replacement and repairs, such as plates, terminals, connectors, separators, etc.

The Universal Battery Co., 3420 S. La Salle St., Chicago, Ill. Write for literature.

The Scientific Garage Oil Heater burns either fuel oil or kerosene and embodies a new principle of oil burning. The burner itself is wickless and sootless, and no matter how strong the flow of fuel it will give perfect combustion. It is so constructed that all heat escapes from the top and none is radiated from the sides, thus making it practical for garages where there is little space between walls and car. It is built on the principle of the miner's safety lamp by which all air for combustion is taken through a fine gauze and through which flame cannot pass. Gasoline can be poured around the



heater without danger of fire. The manufacturers claim a minimum use of fuel to heat the ordinary sized garage.

Manufactured by the Scientific Heater Co., Cleveland, O.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Sunderland Pump is long, smooth working and slender. The single cylinder model, see illustration, has a 24-inch stroke, enabling a frail woman to put 90 pounds pressure into a tire. It is guaranteed for five years. Fair deliveries.



Manufactured by the Sunderland Manufacturing Co., 600 W. 22nd St., Chicago, Ill. Five models—No. 10 at \$2.75 is a new pump with floating piston. No. 100 at \$1.40 is a single cylinder pump. No. 2 for fast action a two-cylinder pump with 17-inch stroke is \$2.35. No. 3, three-cylinder, has 18-inch stroke, \$4.50.

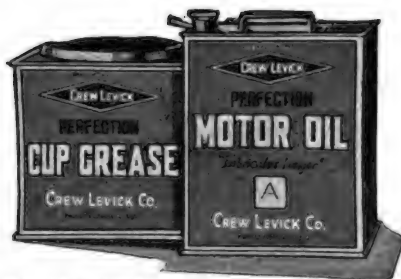
The Ever Last Resole is in fact a complete new tire without beads, and is applied over the old casing. It extends clear down over the beads and when applied to the rim it cannot be distinguished from a new tire. It is not a "sewed on" or "double tread," but is built right on over the old casing, and becomes an integral part of it. It can be successfully attached



by any repair man or vulcanizer. It is made exactly like a new tire of three plies of close woven 21½ ounce long staple cotton fabric. Each ply is treated with a heavy coat of pure rubber and the tread stock is built over this fabric body. Prompt deliveries.

Manufactured by the Ever Last Tread Co., Inc., Indianapolis, Ind.

Crew Levick Motor Oils and Greases are manufactured from crude products obtained from the Pennsylvania fields, which yield the richest grade of crude oil, and are manufactured and backed by one of the oldest and largest producers and refiners in America. They have a name in the trade of being of the very highest quality, a reputation which has been sustained by the makers for over half a century. The purchaser of these products knows what he is getting, as they come direct to the consumer in the manufacturer's regular sealed containers, which are attractive and easily identified. The oil comes in cans containing one or five gallons, while the grease is packed in containers holding 5, 10 and 25 pounds respectively.



Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Write for prices and literature.

The Rain-A-Way Pad is a small felt pad treated with a special solution for rubbing over the windshield. It prevents rain from blurring the vision and keeps mist from collecting. It leaves an invisible film on the glass, which sheds the water. If the pad is applied at the approach of rain it is claimed that the rain drops positively will not collect. Mist or fog are also kept from gathering even on the



coldest days. The pad is not greasy and the preparation used is non-evaporating. It slips in one of the side door pockets and is always ready for instant use.

Manufactured by the Badger Manufacturing Corporation, Milwaukee, Wis. Write for prices and literature.

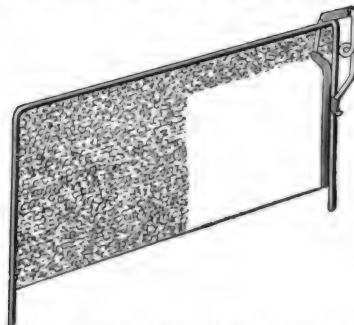


The Goodrich Motor Testing Valve replaces the old style cutout and produces a loud, clear, sharp note. By opening the valve the gases are freely emitted, instead of being forced through the muffler. The bell mouthed opening of the valve allows for ample expansion of the gases, relieves the engine of all back pressure and greatly intensifies the sound of the explosion. Unlike other devices it has no adjustments and is easily cleaned by removing one cotter pin. It is finished in a specially prepared paint, which prevents corrosion and rust. The valve is sold complete with pedal and pulley.

Manufactured by the Goodrich-Lenhardt Manufacturing Co., Widener Bldg., Philadelphia, Pa. Ford and all 1½ inch sizes, \$8; 1½ to 2½ inch, \$3.75; 2½ to 3 inch, \$4.75; 3 inch and over, \$7.50. Made in ¾ inch sizes also.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Woodworth Windshield Cleaner is a wire cleaner adapted to be used on the windshield of any open car. It is made of No. 4 spring steel wire, having a fine japanned finish and having a corrugated rubber tubing where it comes in contact with the glass and windshield frame. This cleaner may be snapped on the windshield in a moment and is a valuable accessory



to any motorist who drives in stormy weather. Prompt deliveries.

Manufactured by the Woodworth Manufacturing Corporation of Niagara Falls, N. Y. Price, 25 cents each. Liberal discount to jobbers and dealers.

The Howard Dustless Household Duster, unlike the old fashioned feather and wool duster, picks up the dust instead of scattering it and on smooth surfaces has a polishing effect. These results save time and make it unnecessary to dust as frequently. It is easily handled and can be used with equal efficiency on either the body or interior of the car without danger of injuring the most highly polished finishes.

The Howard Dustless-Duster, another product of the same company, is a chemically treated black cloth duster that picks up and retains dust and small particles from all polished surfaces, tapestry or upholstery, making it ideal for use about the car. It brightens and restores the original finish on polished surfaces.



The dust that it collects cannot be shaken out, but can be removed by washing the duster in hot water and soap, which treatment does not in any way impair the dust absorbing qualities of the cloth. It is economical as well as efficient, as one duster will outwear from eight to 10 pieces of cheese cloth.

Manufactured by the Howard Dustless-Duster Co., Boston, Mass. Prices: Howard Household Duster No. 14, utility size, 75 cents each; No. 15, large size, \$1.50. Howard Dustless-Duster No. 1, standard, 30 cents each; No. 2, office, 20 cents each; No. 3, auto, 50 cents each.

S R B Stanford Bearings are a strictly high grade bearing in design, material and workmanship. It is produced from the highest grade of chrome alloy steel, is made with the same care as the regular S R B taper roller bearings. It is a bearing that absolutely prevents the rollers from going out of line. Race and cone are ground and the rollers cut to a



perfectly true taper, making the bearing run freely. It is easily installed and will withstand heavy strains. Fair delivery.

Manufactured by the Standard Roller Bearing Co., Philadelphia, Pa. Price, \$10 per set.

The **Economy Vapor Plug** is an auxiliary air valve and is attached to the intake manifold. It is adjustable in such a manner as to obtain maximum results on the engine. Once this plug is installed it works automatically at all times without further attention. It is attached by drill-



ing a 11/32 inch hole in the intake manifold just below the spread. Thread with 1/2 inch pipe tap and the plug is easily adjusted to any car's needs. Prompt delivery.

Manufactured by the Aristos Co., Warren, O. Price, \$3.50.

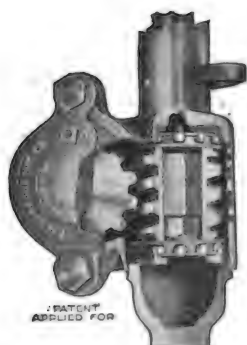
Master Calorite Spark Plugs involve the discovery of the new insulating material known as Calorite, and its adoption in the Master plug, the makers claim, has revolutionized the spark plug industry. This substance subjected to severe electrical tests in competition with porce-



lain, as an insulating material, withstood a 10 per cent. higher voltage than the finest porcelain obtainable. Every Master Plug is wrapped in felt and packed in a round box that may be carried in the tool box, without fear of breakage. Prompt deliveries.

Manufactured by the Hartford Machine Screw Co., Hartford, Conn. Price, \$1 and \$1.25.

The **Sprague Worm Steering Gear** for Ford cars appeals to Ford users because of the safety it adds to the handling of this machine. It replaces the ordinary Ford steering equipment and with this steering gear the driver can safely steer out of ruts, hold the Ford much steadier in mud or sand and he need not worry lest a bump or other bad place in the road will cramp a wheel and upset the car. It holds the Ford to the road just as the worm steering gears hold the larger cars. It also prevents locking over center. Prompt deliveries and liberal



E. H. SPRAGUE
Ball Bearing Floating Ped
Worm Steering Gear

proposition to dealers.

Manufactured by the Sprague Manufacturing Co., Omaha, Neb. Price, \$25.

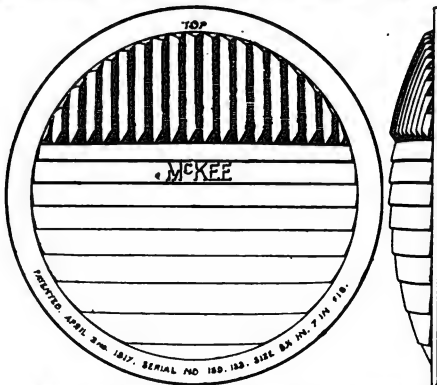
Hudson's G. L. W. Spring Oiler consists of a felt pad with an oil reservoir, contained in a rust proof polished blue metal case. This case snaps over the main leaf of the spring and is so constructed that different degrees of pressure is brought to bear on the felt pad, making the ends perfectly tight and oil proof, thus keeping the top surface of the main spring perfectly clean. At the sides the pressure on the felt is such that it permits a very slow seepage of oil, which fills the grooves along the entire side and is carried between the leaves by capillary action. The manufacturers of this acces-



sory allow a 30 days trial, with money refunded if not satisfactory. Prompt deliveries.

Marketed by the Hudson Sales Co. Factory branch G. L. W. Spring Oiler Co., 7 East Jackson Blvd., Chicago, Ill. Price, 30 cents.

The **McKee Lens** is constructed on the principal of horizontal and vertical prisms, giving a direct beam of light on the road ahead, limited to 42 inches in height, and with sufficient light to the sides to illuminate the curb and passing cars. An exclusive feature of the design is that it is concave-convex. By an arrangement of vertical prisms in a sector across the top the light which is wasted in a plain glass plate, by being thrown skyward is turned back onto the reflector and thence through the horizontal prisms.



Manufactured by the McKee Glass Co., Jeanette, Pa. Prices, 5 inches to 8 1/2 inches inclusive, per pair, \$2.50; 8 1/2 inches to 9 1/2 inches inclusive, per pair, \$3; 9 1/2 inches to 10 1/2 inches inclusive, per pair, \$3.50; 10 1/2 inches to 11 1/2 inches inclusive, per pair, \$4.

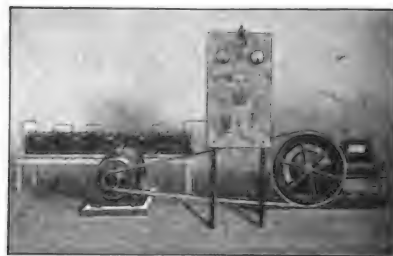
(When Writing to Advertisers, Please Mention The Automobile Journal.)

The **Main Battery Charging Outfit** generates its own current and operates from a line shaft or an engine by belt drive. It charges from one to five lighting batteries at a time from any voltage from six volts up to 30 volts. The dynamo is high grade, shunt wound and of 250 watts capacity with oil ring type bearings and baked black enamel finish. The outfit consists of a slate switchboard with D'Arsonval type ammeter, rheostat, double pole, single throw knife switch, cartridge fuses, irons for mounting and two large flexible leads with large clips. This com-



pany builds a small battery charging set, which is usually driven from a gas engine previously installed in the garage or a line shaft or motor by belt, and it will care for from one to five batteries at a time. It retails at \$85.

A larger set, which retails at \$155, charges from one to 30 batteries at a time. Still larger sets are built in various sizes at various prices from \$300 to \$900 and



will operate upon gasoline, kerosene or natural gas. Fair deliveries.

Manufactured by the Main Electric Manufacturing Co., Pittsburgh, Pa.

The **Universal Vise Attachment** is based upon an entirely new mechanical principle. It instantly converts an ordinary square-jawed vise into a tool of a thousand purposes through the independent action of each "tooth" or "gripper" of its



jaw in clamping the form or shape upon which work is to be done. This vise is very efficient for holding irregular shapes. It is made of cold rolled steel, tempered and electrically welded and will reduce the working time by half where irregular shapes are involved. Immediate deliveries in reasonable quantities.

Manufactured by the Universal Equalizer Co., Cincinnati, O. Price four-inch set, \$8; five-inch set, \$9.

The Black & Decker Tank and Pump is a portable air tank and pump. The outfit consists of an air tank, fitted with a No. 2 electroflator air pump, mounted on a cradle base that is supported by two large wheels and a swivel castor. A pushing handle is attached to the platform and the outfit is easy to handle and steer. The wheels are fitted with rubber



tires for use over hard wood floors or tile. When the tank is empty it is easily pushed to the nearest electrical connection and it refills itself, an automatic switch cutting out the current when the proper pressure is obtained. Prompt deliveries.

Manufactured by Black & Decker, Baltimore, Md. Price, \$225.

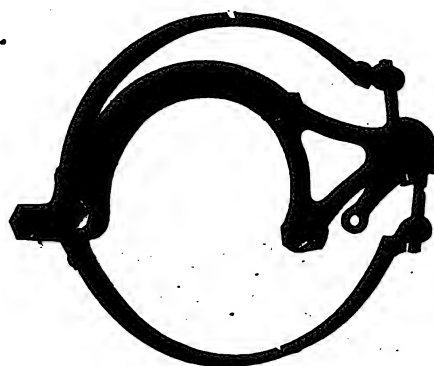
Bay State Autokit Wrenches will remove any nut, bolt or cap screw, reaching it wherever it is located, at any angle. The outfit includes an adjustable ratchet handle and shank with a series of sockets, constituting a complete combination with which every kind of work on a car can be accomplished. These tools



are of proven design and made of the highest quality material, being guaranteed 100 per cent. efficient, and as the makers claim will give extreme satisfaction in the hardest service. Prompt deliveries.

Manufactured by Bay State Pump Co., Boston, Mass. Price, \$12.

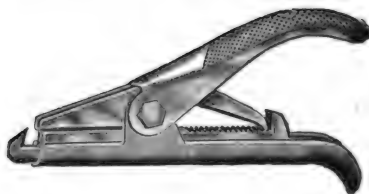
The Holdford Brake, as the name indicates, is designed primarily for Ford cars and may be used in addition to those on the car, or to take the place of either the service or emergency brake. This brake is made from the best of materials, the points where the greatest strain comes are drop forgings, and the lining is J. M. Non-Burn. It is so designed as to be efficient under all conditions, bringing full contact with the external surface of the brake drum, after the first adjustment, until the lining is completely worn out. It may be connected to the foot pedal by means of an equalizing bar, thus relieving the transmission of strain and furnishing a positive brake at all times. In using it on the hand lever the internal



brake may be left inside the brake drum or thrown away, according to the car owner's pleasure. In applying the brake no changes in the car are necessary. Fair deliveries.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price per set when applied to hand lever, \$10; for application to foot pedal, \$15.

The May's Cotter Pin Puller reaches after the cotter pin, straightens it if bent and once taking hold, withdraws it in safety and holds it until released. In a garage or repair shop where much of this work has to be done, this tool will save much time and trouble. The puller is well machined, mechanically correct and is fin-



ished with a heavy nickel plate to prevent rusting. Prompt deliveries to jobbers only.

Manufactured by the Brewer Titchener Corporation, Cortland, N. Y. Price, \$1.25 each.

The Schmidt Cylinder Grinding Machine is designed for grinding gasoline engine cylinders from the smallest motorcycle type to a six-cylinder block 31½ inches long. The base is of the cabinet type and designed to eliminate all possible vibration. The boring spindle, which is designed for strength and rigidity, is six inches in diameter by 12 inches long and carried upon heavy bearings. The face plate upon which the cylinder block is mounted while being ground is large and heavy, and has both a cross and lengthwise feed, the latter being automatic. It is also fitted with two knurled nuts by which the plate may be raised and lowered, thus facilitating the centering of the cylinder. The length of the bed is 55



inches and the width 15¼ inches. The height from the bed to the center of the spindle is 12 inches. Prompt deliveries.

Manufactured by the B. L. Schmidt Co., Davenport, Ia. Price, \$1200.

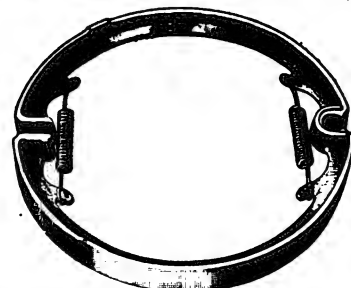
(When Writing to Advertisers, Please Mention The Automobile Journal.)

"Universal" Adjustable Hose Clamps are made from cold rolled ribbon steel with screw and nut ready to attach, and it is pliable enough to easily wrap around and conform itself to the shape of a hose or pipe. The clamp ribbon has holes one-half inch apart along its middle portion and in these holes lies the secret of its adjustment. Between these holes are perforations, which make this clamp so successful. The perforations permit the bending of the ribbon with a slight pressure of the hand or pliers, forming a seat for the bottom of the nut. After the clamp is applied and the screw fully tightened the excessive stock may easily be removed by breaking it off at the score next above the nut. Prompt delivery.



Manufactured by the Universal Industrial Corporation, Hackensack, N. J. Made in two sizes, "Senior" and "Junior." Write for prices and literature.

Brake Shoes for Fords are made in two types, one type being unlined and the other lined with asbestos, having wire insertions and riveted to shoe. The face of these shoes which are in contact with the cam are specially hardened, preventing them from wearing down out of true, and



adding materially to the shoe's life. Sold in original cases only, 50 pairs to a case. Weight, 165 pounds. Prompt delivery.

Manufactured by Adamson Manufacturing Co., East Palestine, O. Prices, unlined, 35 cents pair net; lined, 70 cents a pair.

The Mosco Timer for the Ford Car requires but a minimum amount of attention. The shell is made of heavy pressed steel with aluminum finish. The insulating ring is of gray bone fiber. The terminals are insulated all the way through.



The contact arm is of pressed steel and with the brush assembly may be purchased separately. Prompt delivery.

Manufactured by Motor Specialties Co., Waltham, Mass. Price, \$1.50.



The Hers Spark Plug has a mineralized mica core, which the makers claim is absolutely oil proof. This core is a built up system of mica washers around a tightly wound tube of ruby mica, highly compressed into practically one solid mica unit, which is impervious to oil, heat and moisture. Prompt delivery.

Pro-Mo-Tor Fabricating Corp., 245 West 55th St., New York, N. Y. Price, \$1.50 each.

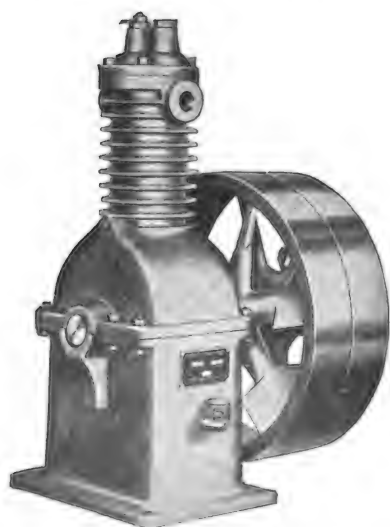
The Curtis Air Compressor has gained a prominent place in the trade, due to its patented system of lubrication, by means of which air free from oil is furnished. The difference between the ordinary splash system in use in some other machines and the "Curtis" controlled splash system may be compared to beating water from a pan with a flat stick, and then trying to empty the same pan of water with the edge of a knife blade. The first system drenches every part of the exterior of the compressor with oil and saturates the air on its way to the tire, which, as every garage man and motorist knows, shortens the life of the tire, as oil rots rubber. The second or "Curtis" system with its knife blade throwers takes from the oil bath just sufficient oil for lubrication, and the oil which reaches the cylinder is further regulated by being thrown on a pin of predetermined size so that just the proper amount for lubrication and no excess is delivered to the cylinder. None is left to work over into the discharge line.

Other features found in the "Curtis" Compressor are:

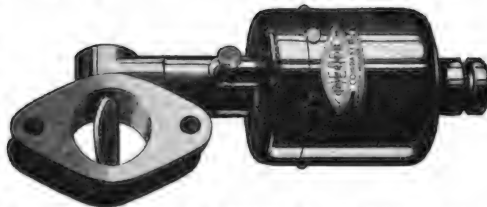
Hand unloader, which permits starting against full tank pressure without burning out the motor, blowing fuses, burning or jumping of the belt; safety cage, which prevents possibility of broken valves dropping into cylinder and wrecking the machine; fan flywheel, which throws a current of air against the cylinder, thereby assists in cooling; valves inspectable without removing the cylinder head; cylinder head can be removed without loosening a pipe connection; high and low level oil filling gauge, showing at a glance the amount of oil in the crank case; bearings of white metal, die cast, adjustable, renewable and non-cutting.

Curtis Compressors are handled exclusively through the jobbing trade. Prompt deliveries.

Manufactured by the Curtis Pneumatic Machinery Co., 1621 Keilman Ave., St. Louis, Mo. Price from \$25 up according to size and style of outfit. Made in five sizes. Each in three different styles of mounting.

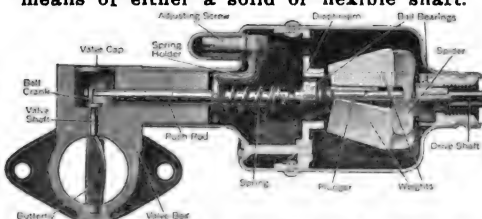


The Pierce Governor, for controlling the speed of motor cars, employs the well known principle of centrifugal force and is entirely enclosed in a housing small enough for any commercial purpose. While every part must be accurate in construction and assembly in a device of this kind, the governor is exceedingly simple. The only rotating part is the weight spider, and as this runs on ball bearings in an oil bath, it must be very



evident that the device is as wear and trouble proof as it is possible to make it. Naturally the governor requires some oil, but this is easily supplied through an oil cup in the case and is distributed to all moving parts by the weights on the spider.

The governor is mounted between the carburetor and the intake manifold and may be connected to the driving agent by means of either a solid or flexible shaft.



In the governor valve box the butterfly valve is normally in a position that does not obstruct the flow of gas, but it is closed so as to reduce the valve port area, just as soon as the motor reaches the predetermined speed. The valve is actuated by what is known as the fly-ball principle. The two weights are mounted on a spider, which revolves on ball bearings, and are so pivoted that as their velocity increases they are swung outward, forcing a plunger forward, which in turn operates the butterfly valve. The plunger is forced against a spring calibrated to a standard pressure so that as the velocity of the weights is lessened they return to normal position and the valve opens. Every Pierce governor is so constructed that the adjustment can be positively sealed by the owner of the truck, thus preventing any attempt on the part of the driver to change the speed.

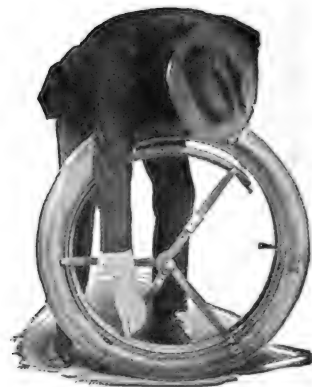
Pierce Governors are now standard equipment on 89 makes of motor trucks and about 12,000 of them were furnished for government use during this year. This demand has more than doubled the gross sales in the past year and in order to meet it the manufacturing facilities have been increased 100 per cent.

Manufactured by the Pierce Governor Co., Anderson, Ind. Write for prices and literature.

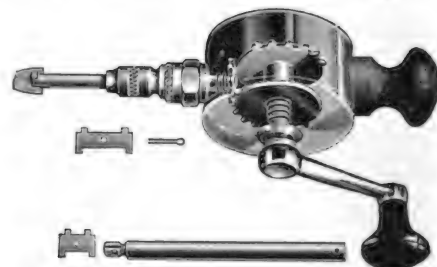
The Lawco Rim Tool removes a tire from any demountable transversely split rim in a minute or less. The tool is easy to adjust, easy to attach and will give quick results. As shown in the illustration this rim wrench is simply a set of claws that can be hooked over a rim and contracted by the simple motion of a lever. After the tire has been fixed it can be replaced while the rim is still in the grip of the tool. A toggle or reverse movement of the lever expands the tool and the rim as much as may be necessary to cause the ends to meet and permit latching. This tool may also be used to break open any rim latch. It is made of forged steel and is strong and simple in design. Prompt deliveries.

Manufactured by the F. H. Lawson Co., Cincinnati, O. Price, \$3.50.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



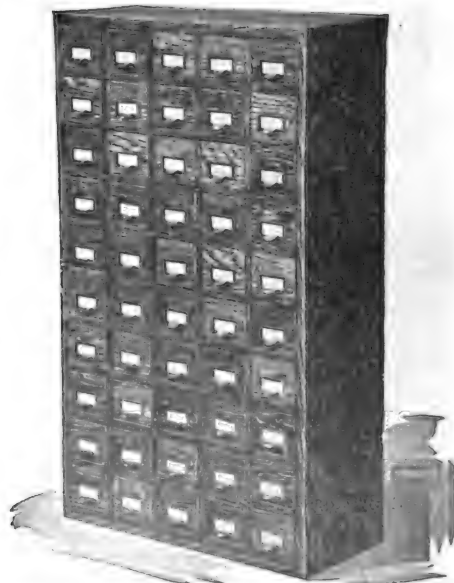
The Sioux Valve Grinder consists of a handle or crank operated wheel which drives through suitable gears the grind-



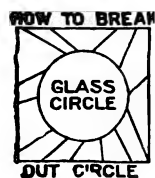
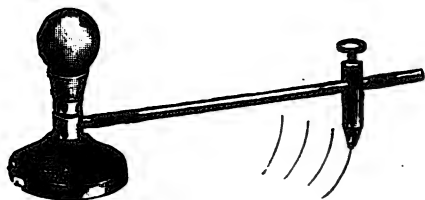
ing tool. The gears are so arranged that by a continuous turn of the crank the tool is given a reciprocating motion, always traveling slightly forward in one direction, then in the opposite, until the whole circumference has been made. With the tool are furnished three special valve head fittings and a special length of shaft for extension purposes. Prompt deliveries.

Manufactured by Albertson & Co., Sioux City, Ia. Price, \$6.

The Universal Screw Cabinet is built primarily for garage use, being designed for screws, brads, nails, nuts, bolts, auto accessories and other small articles. It keeps shelves clean and prevents duplication of stock. It will save its small cost many times in a year in providing a place where every screw or part may be put and where everything can be found instantly when needed.



The Universal Screw Cabinet is made by the Hobart Brothers Co., Troy, O., being furnished in two sizes, 50 drawers (as illustrated), \$19.85, and 100 drawers, \$34.60.



The Red Devil Circular Glass Cutter.

The Red Devil Circular Glass Cutter, No. 633. When in operation, the glass to be cut is placed on a flat surface, the base of the cutter at the centre of the glass to be cut. Careful measurement should be made and the cutter head adjusted to one-half the diameter of the circle to be cut, and fastened in place by the thumb screw. The base to be pressed down and held firmly in place by one hand and the head operated by the other, the point of beginning to be away from the body so as to give the hand of the arm operating the head an opportunity for a wide sweep. Some practice may be necessary, but the cut can be made by a firm pressure, not too heavy, and as nearly as possible by one sweep around the circle without stopping. In cutting, the base must not be allowed to slip or change position, and if necessary, two sweeps or two cuts may be made, as nearly as possible a full one-half circle in each.

The small illustration shows how to break the glass to leave the circular glass for use. Cuts are made from the outer circumference of the circle to the edge of the glass. The pieces can be broken off by gently tapping on the under side of the cuts, but away from the edges of the circle, to prevent breakage of the inner portion.

Manufactured by the Red Devil Tool Works, Smith & Hemenway Co., Inc., 129R Colt St., Irvington, N. J. Price, 50 cents.

The A. & H. Valve Tool is an implement for truing up both internal and external valve and cap threads of nipples of pneumatic tires. It may also be used for cutting threads, making it a valuable addition to the tool kit.



With the True Threader Tool one can recut inside plunger threads, recut outside nipple threads and take out plungers. Prompt delivery.

Manufactured by the A. & H. Manufacturing Co., Inc., 505-507 West 45th St., New York City. The combination tools, \$2.25, or \$1.50 each.

The Black & Decker Tire Inflator Outfit consists of a tank mounted upon an iron base and fitted with compressor, pressure gauge and automatic switch. Immediately upon making the electrical connection the motor is started and air is pumped into the tank until a pressure of 150 pounds per square inch has been reached, then the automatic pressure switch comes into action and stops the machine. To inflate a tire the Romort air chuck on the end of the hose is pressed over the tire valve and the pressure in the tire will rise instantly, it is claimed, to any number of pounds desired. When enough air has been used to cause the pressure in the tank to drop to 125 pounds, the automatic switch starts the motor and brings the pressure back to 150 pounds. After the first electrical connection has been made the machine requires no further attention, since its operation is entirely automatic. A cover is



furnished for the automatic switch, which completely encloses all mechanical and electrical parts. These machines can be used on 110 volt circuits, direct or alternating current of from 25 to 60 cycles. Prompt deliveries.

Manufactured by the Black & Decker Manufacturing Co., 304 Water St., Baltimore, Md. Price, \$215. Write for catalogue of complete line.

The Culver-Stearns' Giant Searchlight is made of steel finished in dull black enamel and fitted with a brass, silver plated over nickel reflectors, scientifically laid out to give the best light under all conditions, and a rear view mirror if desired. When fitted with a nitrogen bulb and properly focussed, it is said to give enough light to enable one to see guide boards, numbers, etc., at practically any distance that the eye could read in daylight. The bracket is made of pressed steel and designed with a universal joint so that the light beam can be thrown in any direction. The light is controlled by a single point switch which is operated by the handle. Prompt deliveries.



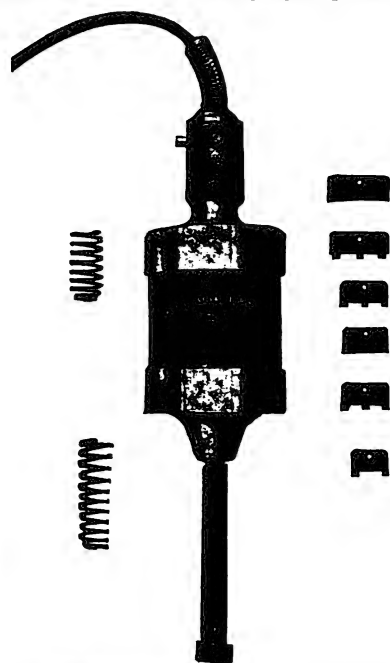
Manufactured by Culver-Stearns Manufacturing Co., Worcester, Mass. Price, \$6.



The Manley 22-Ton Universal Auto Press has a high power leverage, starting at 2200-1 and automatically increasing at the end of stroke to 5000-1. This is obtained by the lever fitting into the socket on ratchet block. The paul uses the same notches in hand wheel and tremendous pressure is obtained on the screw with little effort. An important feature of this press is that the screw being exposed at the top may be struck a sharp blow in obstinate cases, such as a rusted shaft, which pressure alone will not move. The low power press (1000-1) leverage is 10 times quicker than a ratchet. Prompt deliveries.

Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Price complete, \$105.

The Eclipse Valve Grinder is a practical and reliable electric driven machine, designed and built for the sole purpose of grinding valves to a perfect seat with the greatest possible dispatch and economy. The vertical handle with plunger switch affords perfect control, while the weight of the device (4½ pounds) is so proportioned as to secure the proper pressure



for the best results; and the smooth gliding motion imparted by the ballistic movement produces a finish to both valves and seat that is free from grooves, scratches or other evidences of poor workmanship. With this machine few valves require as much as a four-minute treatment—many are finished in one minute.

Manufactured by the Eclipse Valve Grinder Co., 1230 Lydia Ave., Kansas City, Mo. Price, \$40.

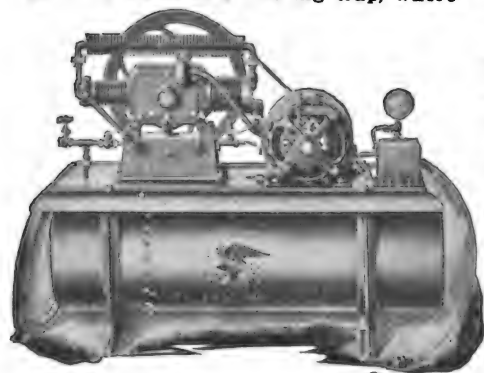
(When Writing to Advertisers, Please Mention The Automobile Journal.)



The Red Spot Searchlight brought out by the F. W. Wakefield Brass Co., is larger in size and of greater power than the average spotlight. It is seven inches in diameter and has a 30 candle power lamp. The operator of the car may flash either a white or red beam of light from the lamp by turning a switch, making it serviceable, either as a spotlight or danger signal. Prompt delivery.

Manufactured by the F. W. Wakefield Brass Co., Vermillion, O. Price, \$10.

The De Luxe H 34 U. S. two-stage automatic air compressor has many exclusive features that make it an efficient and complete air plant. The air is drawn into a large area cylinder through a special intake silencer device and is compressed to 40 pounds, after which it is delivered to a smaller diameter high pressure cylinder through an air cooled pipe leading from the head of the smaller. The air is forced by a smaller piston through a special check valve to a filtering trap, where



foreign matter and oil is removed, and thence through an automatic adjustable safety valve to the storage tank. Pressure control is by automatic valve, which stops the engine when a predetermined pressure is reached falls below a given mark. Cylinders and crank case of compressor are cast en bloc. Prompt deliveries.

Manufactured by the United States Air Compressor Co., Cleveland, O. Prices furnished on application.

Pressure Proof Piston Rings completely eliminate the causes of carbon, insure perfect lubrication and restore maximum power. A spring expander automatically takes up any excess width in the ring



Pat. March 2, 1915, Feb. 29, 1916. groove, consequently all possibility of either oil or gas passing between the cylinder walls and the piston is eliminated.

Manufactured by the Pressure Proof Piston Ring Co., 169 Massachusetts Ave., Boston, Mass. Write for prices and literature.

The Continental Motor Stand is universal handling the Ford engine or any three-point suspension engine from any kind of a passenger car, truck or tractor. The stand is portable and can be moved to adjust the engine in any position.

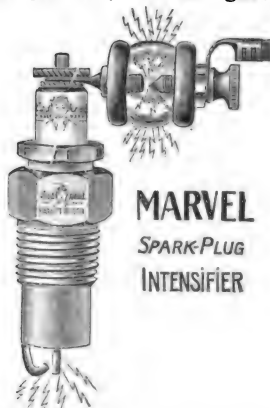
The engine is fitted to the stand in the same position that it is fitted to the chassis and all bolts and clamps necessary are furnished as complete equipment with the



stand. It is adjustable in width from nothing to 30 inches. Has a 5-inch adjustment in height and can be locked in over 25 different positions. Prompt delivery.

Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Price, \$50.

The Marvel Spark Plug Intensifier overcomes ignition trouble on internal combustion engines. The spark that is produced at the point of the spark plug when the spark gap is in series with the spark plug, results in a fatter, stronger, better spark than would otherwise be produced. The spark produced with the gap permits the use of a leaner mixture, that not only saves gasoline, but also cuts down carbon deposits in the cylinders. This is because carbon comes largely from the partially burned gasoline, re-



sulting from the use of too rich a mixture. Prompt delivery.

Marketed by Wm. Simpson, 228 S. Wells St., Chicago, Ill. Price, 50 cents each.

The Wagner Engine Cleaner, which is operated by six pounds air pressure, enables one to clean places that cannot be reached in any other way and through its use one quart of kerosene will clean any size motor. The passage of the air



through the cleaner head carries the kerosene with it in the form of a spray. Delivery 30 days after receipt of order.

Manufactured by Wagner Specialty Co., 1902 Broadway, New York City. Price, \$2.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Shurnuff Windshield Ventilator consists of two black enameled metal up-rights attaching to the hinges in the center of the present Ford windshield and fastening to the cowl where the present



windshield castings are set. These up-rights are so shaped as to make the sides of the shield rain proof. A metal and rubber strip is provided, which, when fastened to the cowl, makes it rain proof at the bottom, and a metal handle is also furnished for attaching to the lower sash in order that it may be pulled backward. Four small plates are furnished, same being attached to lower corners of 1915-16 and early 1917 shield only. Prompt delivery.

Manufactured by the Shurnuff Manufacturing Co., St. Louis Mo. Price, \$7.50.

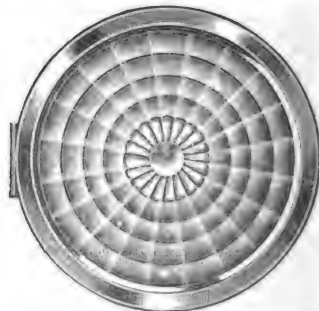
The Outlook Cleaner is attached to the windshield of the automobile. An adjustable wiper is held against the outside of



the windshield and fastened to it is an arm which may be reached from the seat of the machine. By swinging this arm through a half circle, rain, snow or fog is automatically removed from the portion of the windshield over which the wiper passes. This device is made in two styles, one for open cars that is attached to the top of the windshield, the other for closed cars, which is attached through the glass. Prompt deliveries.

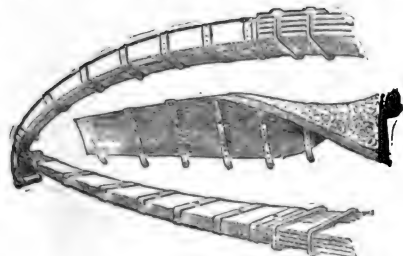
Manufactured by the Outlook Co., 5535 Euclid Ave., Cleveland, O. Price, \$1.50.

The More-Lite Lens is composed of a number of triangular shaped prisms, radiating from a common center and separated by diagonal lines. A daisy petal design is cast at the center, which adds to the attractiveness of the lens. It is designed to diffuse the headlight beams without the blinding effect and yet illuminate sufficiently for all driving needs. In either clear white or amber glass for any size of headlight. Prompt deliveries.



Manufactured by L. E. Smith Glass Co., Mount Pleasant, Pa. Prices range from \$1.50 to \$2.25 for clear white lenses and from \$2 to \$2.75 for amber.

The Woodworth Lubricating Spring Covers are made of either leather or an imitation and completely enclose the springs, keeping out dust, dirt, moisture and rust and keep every spring automatically lubricated, including parts which are inaccessible to ordinary methods of greasing or oiling. This provision eliminates squeaking, gives greater riding comfort and prevents spring breakage. The edges of the covers overlap on the underside and are held in place by small straps and buckles, which permit of perfect adjustment. They are finished in black and made of the best quality of genuine leather in one style and of a good grade imitation leather in the cheaper quality. A thick felt wicking forms the lining and provides the means to hold and automatically distribute the oil. One oiling will last a year or more. Prompt deliveries.



They are made in complete sets for Fords and in seven other sizes to fit all other cars.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Price per cover: Leather, 14 in., \$1.10; 16 in., \$1.30; 18 in., \$1.50; 20 in., \$1.65; 22 in., \$1.80; 25 in., \$2; 28 in., \$2.25. Imitation, 14 in., 70 cents; 16 in., 80 cents; 18 in., 90 cents; 20 in., \$1; 22 in., \$1.10; 25 in., \$1.30; 28 in., \$1.50.

The Imperial Auto Folding Chair was primarily designed for a convenient auxiliary folding seat in an automobile. It folds compactly in a small space when not in use and is an ideal chair for the camp, beach, launch or car. The seat and back rest are padded with felt and uphol-

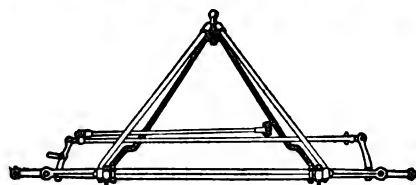
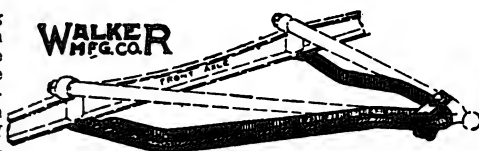


stered in black water proof art leather. The frame is made of special oval formed steel finished in black enamel.

Manufactured by the Imperial Bitt and Snap Co., Racine, Wis. Write for prices and literature.

The Ford Auxiliary Radius Rods for reinforcing the regular Ford radius rods also brace the front axle, keeping it straight, thus bracing and preventing the breakage of the regular rods. They are attached without drilling, for they simply clamp onto the rear of the regular rod and are fastened to the axle by using the regular Ford perch bolt. Made of solid three-quarter inch steel rods, with mal-

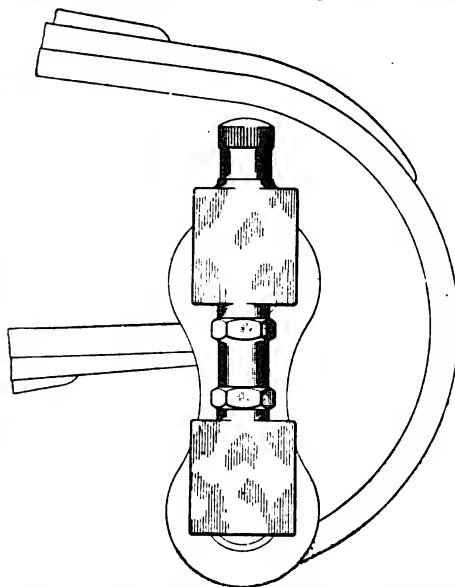
(When Writing to Advertisers, Please Mention The Automobile Journal.)



leable clamp, the outfit weighs 12 pounds, and a still lighter type of angle iron stock weighing five pounds and a tubular type of the same weight.

Manufactured by the Walker Manufacturing Co., Racine, Wis. Prices from \$2 to \$4.

The Meckel Shackle Bolt Lubricator is secured to the side of the spring shackles and lubricates both the upper and lower



bolt. It is designed to fit any make of car in place of the grease cups at present in use. A valve set in motion by the car when running permits the oil to flow and as soon as the car stops the flow of oil is automatically shut off. The lubricators for double shackle bolts have two reservoirs, while those for single spring bolts and spindle bolts have only one. Either of these can be attached in a few minutes the manufacturers claim. One filling of the reservoir is said to last 2500 miles of ordinary travel. Fair deliveries.

Manufactured by the Meckel Lubricator Co., Lakewood, O. Prices: Style "A," double shackle bolt lubricator, \$2 each; style "B," single spring bolt lubricator, \$1 each; style "C," single spindle bolt lubricator, \$1 each.

J. H. Williams & Co., Brooklyn, N. Y., have developed standard lines of every "Superior Drop Forged Wrenches" to meet all recognized trade needs. They now carry some 40 patterns in about 1000 sizes with openings running from 3/16 to 7 1/2 inches.

Most of their lines are carried in three standard conditions of finish: Unfinished, forgings are milled only; semi-finished, forgings are milled, case hardened, black lacquered and have heads ground bright; finished, forgings are polished, case hardened (mottled color) and lacquered heads bright.

For conservation purposes as requested by the War Industries Board, this company, in common with all other leading drop forged wrench makers, have discon-

tinued for the duration of the war the manufacture of several lines, as well as all finished wrenches. In most cases those styles discontinued are important, but they can usually be replaced without great sacrifice by one of the retained lines. While the present stock of discontinued goods lasts, however, it is available for current demand.

In order to encourage the selection and use of proper wrenches and to reduce to a minimum without impairing efficiency the stock and assortment carried by dealers and users, many "Wrench Sets" for a wide variety of purposes have been developed. These "Sets" in serviceable canvas pocket rolls, make for convenience,



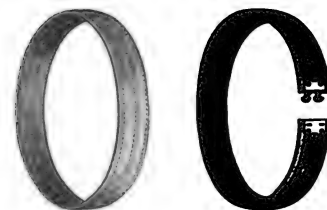
good order and neatness—they supply the tool that is wanted when it's wanted, without duplication and with no size missing.

As an instance of the efficiency of these "Wrench Sets" note the two listed herewith: Set No. 4, Big Six, six standard wrenches for U. S., standard nuts and cap screws. Openings 7/16 to 1 1/4 inches, 12 sizes, no duplicates. Set Ford "A," 12 wrenches for Ford services with openings 19/32 to 57/64 inches, 13 sizes, no duplicates.



This company is operating two large plants at Brooklyn and Buffalo, N. Y., and maintains in addition a western office and warehouse at Chicago. With their large manufacturing facilities and three distributing centers they are in a position to handle promptly and efficiently not only demands for Superior Drop Forged Wrenches, but also for their machinists' tools, including "vulcan" tool holders, lathe dogs, clamps, etc.

Woodworth Fan Belts for Fords are made of a very strong inelastic webbing faced with a specially prepared leather, giving a strong grip and long wear. They are strongly made with three rows of stitching and are furnished in both end-



less and detachable types. This same belting is also furnished in coils for splicing with belt hooks.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: Ford endless belt, 40 cents each; Ford detachable belt, 50 cents each.

Woodworth Hook-On Strap and Lace Tire Boots are for use in strengthening casings over weak spots as a means of preventing blowouts or for placing over blowouts in emergency so that a new tube or repaired tube can be used until a new casing is secured or the old one repaired.

The hook-on type are made of heavy leather in two styles, one studded, with middle filled with flat head rivets and the other reinforced with extra strip of leather under rivet heads. The strap boots are held in place by lacing across



the rim with strong strap adjusted by buckle. They are reinforced on the center and have flat head rivets to protect the leather from wear. The lace boots, similar in type, do not have extra reinforcement of leather in center and are fastened by lacing with chrome leather lacings passing through steel hooks in the edge of boot.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Write for prices and literature.

Mistokleen is a varnish preservative which not only improves the gloss on automobile car finishes, but makes the coats flexible and lasting. It is a scientifically blended product, containing the best known polishing agents. It is applied in the most simple way, being sprayed on and after the surface has been



polished slightly, the body appears clean and bright. It can also be used to remove tar and grease from the car without damage to the finish.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Prices: Ready filled sprayer outfit complete, \$1.25; quart can of Mistokleen, \$1; gallon can, \$2.75.

Howe Kork Tred Transmission Lining for Fords has inlays of cork. The exclusive and distinctive feature of this lining is the air cushioned retaining cup, which is riveted in the lining and holds the cork disk securely in the fabric. As a result of such construction a pocket of air is trapped between the cork disk and the bottom of the cup, the cork disks engaging the drum first when pressure is applied to the brake pedal. The braking pressure, however, compresses the air in the cups and drives the corks flush with the fabric, thus permitting the fabric to take its full share of the wear and allowing the cork to retain its full frictional value.



When the pressure is released the compressed air in the cup brings the cork back to its original position—protruding slightly above the surface of the fabric—so that each disk possesses its entire braking value when brake pressure is again applied.

"Kork Tred" lining, according to the maker, not only eliminates all the troubles common to ordinary linings, which become smooth and slippery with wear and lose their gripping qualities, but the cork disks will not break loose from the fabric.

Manufactured by the Howe Manufacturing Co., Chicago, Ill. Price, \$3 per set.

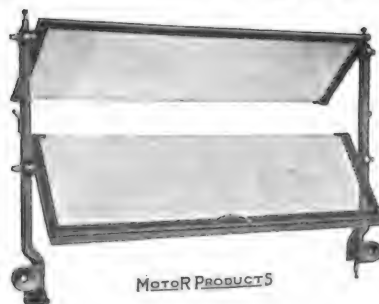
The "Liberty Bell" is different from the usual type of signal. Its tone is distinctive, clear and musical. It is very ef-



fective, yet does not offend the hearing. At the same time the signal sounds a brilliant red light flashes through the lens surmounting the bell. By this means the warning is conveyed to both the eye and ear of the pedestrian or approaching motorist. Prompt deliveries on reasonably large orders.

Manufactured by the Liberty Bell Co., Cleveland O. Prices from \$6 to \$14.

Motor Products Windshields in two new styles are being marketed to supply a demand from the trade for this popular type. Both have the "rain vision" and ventilation features. The passenger car windshield shown in the illustration is complete ready for attaching by simply



taking off the old windshield. It can be equipped with top fasteners if desired, which will eliminate the straps originally furnished for holding the top.

The commercial type of windshield shown is equipped either with or without the slip dash illustrated, and eliminates

the stay rods which usually form a part of Ford commercial car equipment. The new shield, as may be seen, bolts directly to a straight dash. The brackets being so constructed that they hold the shield rigidly in place. Prompt deliveries.



Manufactured by the Motor Products Corporation, Mack Ave., Detroit, Mich. Prices: Model Z-17, \$17; model 100, \$19; model 10, \$22; slip dash, \$3.50 extra.

The Adamson Model E Vulcanizing Set includes vulcanizer, can of Adamson dry fuel, a box of 12 patches, measuring cup, sand paper and directions.



While serving its purpose as well as any of the large outfits for vulcanizing, it is much handler and efficient, as it can be packed away in the car among the tools or in any small space and is ready for use at an instant's notice. Prompt delivery.

Adamson Manufacturing Co., East Palestine, O. Price, \$1; extra box of patches, 25 cents; extra can of dry fuel, 50 cents.

Mistokloths are individual pieces of cloth of open texture, soft and free from lint and are packed in handy packages that can be readily stored in the tool box or door pocket of the car. They fill the need that is ever present about an automobile and are particularly suited for polishing the body, as they rub dry and



polish the smoothest surface without scratching. For cleaning and polishing reflectors, lenses and other parts, work which requires an absolutely clean cloth, the Mistokloths are excellent.

Manufactured by the Crew Levick Co., 111 N. Broad St., Philadelphia, Pa. Prices: Standard size box, containing 12 Mistokloths, 50 cents; small package of six "Kloths," 25 cents.

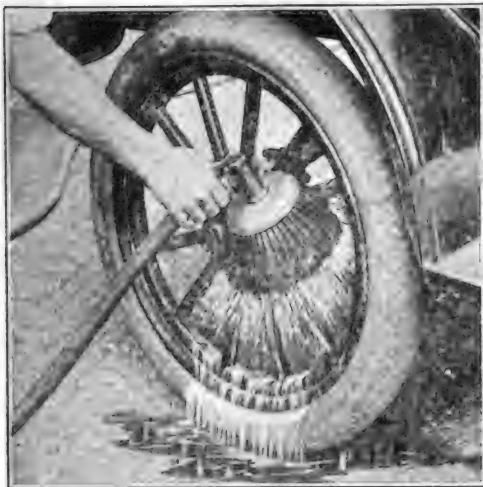
(When Writing to Advertisers, Please Mention The Automobile Journal.)

Woodworth Easyon Chains for pneumatic tires can be quickly and readily put in place without trouble, as the car does not have to be jacked or moved, the individual chains being snapped on over the tire. Four single chains on each wheel afford traction and prevent skidding. They come packed in bags, eight comprising a set.



Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: For 3 or 3½ inch tires, \$4 a set; for 4 or 4½ inch tires, \$5 a set; for 5 or 5½ inch tires, \$6 a set; extra or repair cross chains, 25 to 40 cents each.

The **Water Spray Auto Brush** is made of the best grade of bristles, circular in shape and has a hose connection in the center through which water is sprayed. The patented part consists of an aluminum valve forming the handle of the brush and controlling the flow of water as the brush is used. As opening in the bristles enables the user to direct a spray



of water at a distance and increase the volume as desired.

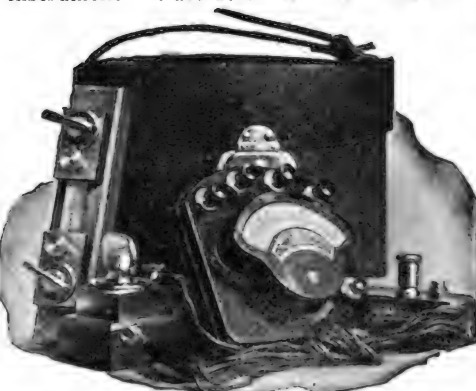
Marketed by Scully-Jones Co., Chicago, Ill. Prices: Short handled Water-Spray Auto Brush, \$8; 3-foot extension Water-Spray Auto Brush, \$10; extra brushes, \$3.75.

The **Champion Spark Plug Cleaner** consists of a glass tube containing 50 loose, hardened steel needles. One end of the tube is open and fitted with a rubber bushing into which a spark plug can be screwed in exactly the same manner as it fits into the cylinder head of the engine. The tube is half filled with gasoline, the plug screwed into the bushing, then the whole is shaken vigorously for a minute or two and the plug is cleaned as thoroughly as if it were disassembled and cleaned. When the tube is shaken it

starts the needles in motion and they peck away at the inner surface of the plug where the carbon has accumulated. Prompt deliveries.

Manufactured by the Champion Spark Plug Co. of Toledo, O. Price, 75 cents.

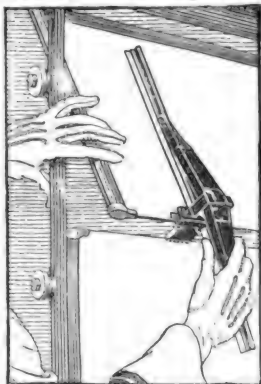
The **Weston Garage Testing Instrument** indicates and locates accurately and quickly the troubles to which electrical systems are liable. Among these are those attributable to deteriorated or run down batteries; short circuits or grounds at any point due to worn sockets; open circuits due to vibration, abrasion or loose lamps; leaks that result in continuous discharge of batteries; brush troubles in the motor or generators or worn commutators, etc. The Weston instrument detects these troubles and is reliable, permanent in calibration and generally serviceable. The instrument illustrated is the Weston



model 280 voltammeter, with external shunts for ampere measurements. It is pocket size, has a uniform and legible scale, is quick in action and is shielded from disturbing influences of external magnetic fields. With its six different ranges (300, 30 and three amperes and 30 and three volts and 100 millivolts) it is actually six instruments in one. The price of the instrument is exceedingly low for such equipment. The special inducements offered by the manufacturer will interest every progressive member of the trade. Deliveries contingent upon conditions.

Made by the Weston Electrical Instrument Co., 103 Weston Ave., Newark, N. J. Price, \$32.50.

The **Tri-Co Rain Rubber** can be easily attached and readily removed, cleaning both the top and bottom glass of the windshield the full width across. Multiple faces of gum rubber make the cleaner flexible with two cleaning surfaces on



each arm. The rivets are topped with celluloid heads, so that they will not scratch the glass. One desirable feature

is that the device can be removed by simply opening the glass and lifting the rain rubber off. It is made in five different models, designed to cover any type of two-piece windshield. Prompt delivery.

Manufactured by Tri-Continental Corp., Buffalo, N. Y. Price, \$1.50.

The **Taylor Leakage Proof Ring** for Fords the makers claim does away with all loss of compression, oil throwing, carbon trouble and loss of power. The interlocking, underlapping joint makes a per-



fect seal, which compression or explosion gases and oil cannot break. It is made in 3¼x¼ size only and is strong and durable, being ground to accurate size. It wears uniformly, having no points to break or catch carbon. Prompt deliveries.

Manufactured by the G. H. Dyer Co., Cambridge, Mass. Price, 50 cents each.

The **Storm Connecting Rod Bearing-Reamer Jig and Straightening Gauge** has been on the market less than six months and large numbers have already been sold. By the use of this jig the connecting rod bearing may be reamed to correct size and alignment by even an inexperienced man and in one-tenth the time ordinarily required. Above all the tool has the advantage of mechanical accuracy. In other words, an inexperienced man will do more and better work with it than is possible even by an expert without it.

It is highly important even where a burning in stand is used, it being a simple matter to ream to a predetermined undersize. Thus each will be burned uniformly and without undue strain. Another advantage of the reamed bearing



resides in the fact that any grit or foreign matter that may have embedded itself in the metal is removed, leaving nothing but the clean, pure metal. Testing surfaces and arbors enable the work man to quickly determine and correct any defect of alignment, which is of great importance and the only way to insure a good job and a smooth running motor.

Manufactured by the Storm Manufacturing Co., Thompson, Ia. Price with reamer and arbors, \$30.

Stickit is a new wrench set that consists of a double end ratchet wrench and seven strong stamped steel sockets strung on a square steel shank. One end of the wrench fits the shank and the other end the sockets. The wrench also fits four sizes of nuts and with the socket 11 different sizes of nuts and cap screws. The other end of the shank has a ball stop and a spring ball for holding the socket in use in place. It is not necessary to remove all the sockets from the shank in order to use it, although it can be done in an instant. Prompt deliveries.

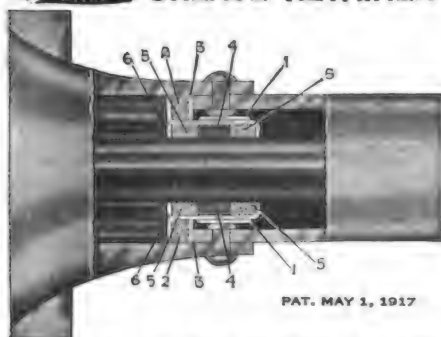
Manufactured by the Bay State Pump Co., Boston, Mass. Price, \$3.50.



(When Writing to Advertisers, Please Mention The Automobile Journal.)

Shurauff Grease Retainer for Ford axles consists of three felt washers, one rubber asbestos washer, a cold drawn steel cup and two retaining rings. The retainer remains stationary, the two rivets that are

SHURAUFF GREASE RETAINER



1. Steel Cup. 2. Large Felt Washer. 3. Large Steel Retaining Ring. 4. Asbestos Washer. 5. Small Felt Washers. 6. Small Steel Retaining Ring.

already in the axle preventing it from turning. The company furnishes a counter display free to dealers with each dozen pairs. Prompt deliveries.

Manufactured by the Shurauff Manufacturing Co., St. Louis, Mo. Price, 90 cents per pair.

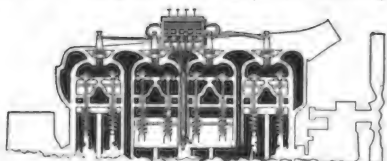
The **Utility Varnish Renovator** is applied with waste or cheese cloth, or by the spray method. The manufacturers claim that this cleaner will remove road tar and that it contains no chemicals that will damage the finish in any way, be-



ing non-acid and non-alkaline. Prompt deliveries.

Manufactured by Poughkeepsie Utilities Corporation, 36 Winnikee Ave., Poughkeepsie, N. Y. Prices: \$3 per gallon; \$1 per quart; 50 cents for 12 ounces; 25 cents for four ounces.

The **Harlan Ignition and Spark Plug Tester** is a device to be attached to any internal combustion engine using high-tension ignition, from four to 12 cylinders, and designed (to test) for defects in



the ignition system or the spark plugs, thereby facilitating the location of any trouble.

The tester weighs 1½ pounds and consists of a metal frame connected to the engine head, or grounded with relation to the engine on either side. In this frame is mounted three insulated rollers, which hold the terminal connections, the center roller bearing, stationary.

To test the ignition the bottom roller is turned downward, this action separating all the terminals at the same time, showing the sparks on their way to the engine plugs, thus instantly revealing the hot or weak sparks.

To test the spark plugs for high resistance the top roller is turned, bringing the resistance testing bar down. For testing for fouled or short-circuited spark plugs the contact members which extend above the frame are pushed down into contact, enabling one to locate the defective plug. Made for engines with 4, 6, 8 or 12 cylinders.

This tester can also be used as a spark intensifier. Prompt deliveries.

Manufactured by the Harlan Ignition Instrument Manufacturing Co., Watsonville, Cal. Prices: \$8 for four cylinder type, or \$2 per cylinder for any model.

Liquid Veneer, a cleaner and polish for automobiles, is applied with a sprayer and loosens the dust and dirt so that it can be readily wiped off with a cloth without scratching the body finish. Its



use makes washing unnecessary only when the car has become heavily caked with mud. It is equally effective on windshield, leather upholstery, top or body.

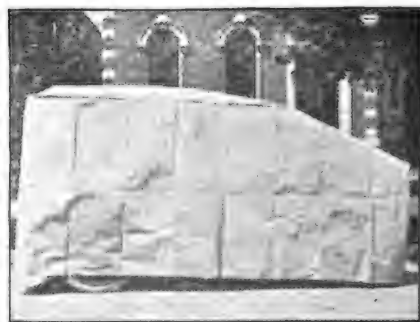
Manufactured by the Buffalo Specialty Co. Buffalo, N. Y. Price, \$1.50 with L. V. sprayer.

Woodworth Easyon Truck Chains are designed to handle with ease and quickness so that they can be put in place when needed without unnecessary work and trouble and removed with the same dispatch. They are substantially made to give long service and so that the tread chain is renewable. All parts in contact with the spokes are leather covered to prevent marring the finish. They are sold singly or in sets of 12.



Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: Small chains, \$7.50 per set; medium, for tires from three to five inches, \$12 per set; large, for tires from five to seven inches, \$15 per set; small dual chains for dual tires smaller than four inches, \$19.20 per set; large dual chains for dual tires larger than four inches, \$24 per set; extra cross chains from 35 cents to \$1.50 each, according to size.

The **Kennedy Auto Covers** are a live proposition for dealers. The season is almost at hand when car owners will store their automobiles and these cars should be protected. This company has designed covers for practically every purpose of storage. The cover protects the car from dust, dirt, cold and moisture. The makers claim that there is nothing better to put over a car for storage and the advantages of this cover are easily realized, for it also protects the tires by excluding the light and thereby preserving the rubber. The covers are made in different sizes for five and seven-passenger cars, also electrics. They are made of heavy, durable paper, that is securely reinforced to prevent tearing and which

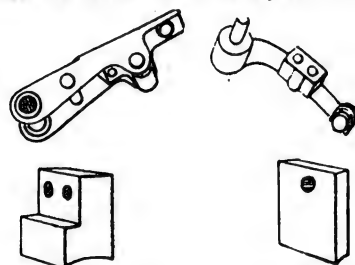


completely covers the car. There is also a cover of lighter weight paper and without the reinforcements, which gives good service when the cover is not to be used more than once. Five-passenger covers will cover the popular priced touring car and roadster with wheelbase up to 115 inches. For larger cars the seven-passenger size is preferable. Ford covers are for cars with short wheelbase. Shipped in lots of six or more.

Made by the Kennedy Car-Liner and Bag Co., Shelbyville, Ind. Write for prices and literature.

Superior Parts for all makes of ignition devices and Superior Brushes for every type of starting and lighting system are made of the very finest grade of materials, guaranteed to fit perfectly and are sent with the understanding that the full purchase price will be refunded for any part that does not give entire satisfaction.

The parts used in the electrical equipment, the very heart of the automobile, engage the attention of every automobile



dealer and repair man in the particulars of their quality and the maintenance of an adequate supply. In marketing Superior parts the makers emphasize these points: Prompt attention to every order; the making of parts from the finest grades of materials; the most attractive prices to be found in this market and deliveries when promised. These elements of their goods and service have played an important part in the huge success of Superior parts. Fiber and hard rubber insulation bushings, washers, etc., for every type of electric device used on automobiles are manufactured by this company, which also reabbritts connecting rods for Ford, Studebaker and other engines. Prices on the latter work are in accordance with the sizes. Prompt deliveries.

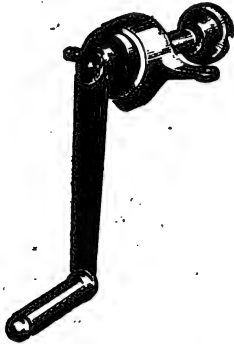
Manufactured by the Specialty Manufacturing Co., 637 Massachusetts Ave., Arlington, Mass. Write for prices and literature.

The **Gates Vulco-Cord Belt**, by a patented process, is built on a curve to fit the pulley. The makers claim that it positively grips, so that it cannot slip on the pulley—and will not stretch. The company makes these belts in standardized sizes, each belt carrying a label, which shows the cars it will fit, thus making it possible for the dealer to fit all the cars in his territory from a stock of eight or nine standardized sizes.

Patented and manufactured by the Colorado Tire and Leather Co. at Denver, Col. Write your jobber for literature and quantity prices.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Carson Kickless Crank eliminates the danger of injury from back firing when cranking an automobile engine. This device is sold under a forfeit of \$100, which may be collected from the manufacturers in case a person using the device is injured by the kick of the crank handle. The mechanism of the device is quite simple and it is claimed that there is practically nothing to break or get out of order. It can be attached in a few minutes.



Prompt deliveries.

Manufactured by Carson Manufacturing Co. of Richmond, Va. Price, \$7.50.

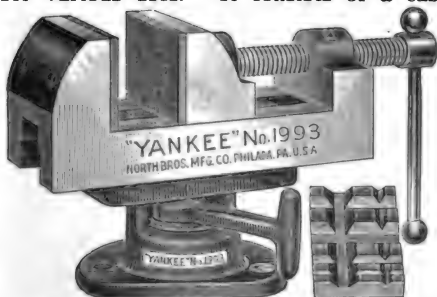
The Ambu Plate Press is for use in pressing the negative plates of storage batteries to reduce the bulging of the active material and to straighten the grids should they buckle. It has no metallic sections that can be reached by the dripping acid and whatever acid is



squeezed from the plates runs through a being faced with steel, are practically indestructible. The jaw opening mechanism is operated by a hand wheel and screw, the sliding jaw being supported upon two heavy round pieces of cold rolled steel. The sliding jaw is fitted with a three-gear reduction spindle, with provision for handle upon each gear. The upper spindle extends through the jaw and is fitted with device for holding square shank drills, thus forming a drill press. Fairly good deliveries.

Manufactured by the American Bureau of Engineering, Chicago, Ill. Price, \$32.50.

The Yankee Vise, No. 1993, is designed for various uses. It consists of a cast



iron body fitted with a sliding jaw, also of cast iron, which is carried back and forth by a 3/4-inch steel screw. Both jaws

(When Writing to Advertisers, Please Mention The Automobile Journal.)

are fitted with steel faces and the sliding jaw extends through a slot one inch wide in the body of the vise. The device is mounted upon a swivel base and may be removed for use on a drill press, a shaper or with other machine tools. It may be used for various kinds of work on the automobile. The space between the jaws when fully open is 3 1/4 inches. Fair deliveries.

Manufactured by North Bros. Manufacturing Co., Philadelphia, Pa. Price, \$7.75.

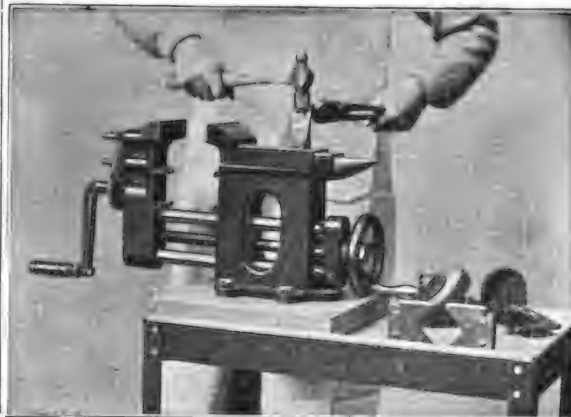
The A. C. Carbon Proof Spark Plug is a new type of this famous make of plugs and a sectional view is reproduced herewith. This plug was designed primarily to overcome the carbonizing trouble experienced in a certain tractor engine using kerosene as a fuel. The results were so satisfactory that it was decided to put the plug on the market for use in automobile engines. It is made in sizes for the Ford, Overland and Studebaker



cars, and in tests on Ford cars covering a period of one year the manufacturers claim that no instance has been found where a plug was removed on account of carbonizing. The porcelain is provided with a number of ribs, having saw tooth edges which attain a sufficiently high degree of heat to burn away the carbon, thereby keeping the edges free from deposits and eliminating any chances of possible short circuit.

Manufactured by the Champion Ignition Co., Flint, Mich. Write for prices.

The Stewart Handy Worker is, primarily, a vise, but of special construction, so that many tools can be used with it. As a vise the jaws open to 4 1/2 inches and



Manufactured by the Chicago Flexible Shaft Co., 12th St. and Central Ave., Chicago, Ill. Price, \$16; \$18 West of Denver.

Woodworth Steel Studded Treads are made of special water proof, non-stretching, non-cracking leather and are attached over the tire by rings over each side. They are practically puncture proof and protect the tires from all road wear and bruises and their use makes non-skid chains unnecessary for wet or muddy roads. They hug the tires closely so that the latter do not become heated or chafed from friction. When placed over



old or worn out casings the latter can be made to give many extra miles of service. They are made in two styles: Center studded, with studs only on the middle portions; full studded, with studs on center and thin head rivets on side.

Manufactured by the Woodworth Manufacturing Corp., Niagara Falls, N. Y.

The Beach Automatic Grip Puller can be used for removing either wheels, gears or flywheels, and is so designed that when pressure is applied by turning the screw

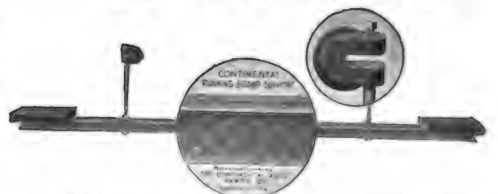


the jaws are pulled towards the common center, thus making a positive, but automatic grip.

The body of the device is so designed that the jaws are removable, simply by the slipping out of the cotter pins and cross pins, thus permitting the insertion of larger or smaller jaws. Two sets of jaws are furnished; three 7 1/2-inch jaws which open to 10 inches, and three 12-inch jaws, which open to 18 inches. Fair deliveries.

Manufactured by the Greb Co., 202 State St., Boston, Mass. Prices, \$25 east of Rockies; \$30 west of Rockies. Liberal discount to dealers and jobbers.

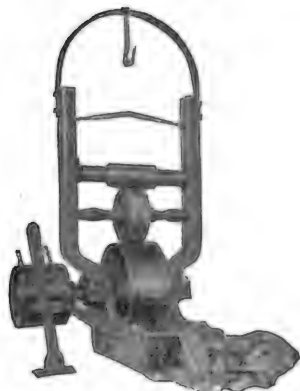
The Continental Running Board Support provides additional support to the running board, takes out the rattle and enables the owner to carry batteries, tool boxes and luggage, the weight of which would ordinarily bend the running boards out of shape. This device is a necessity



to Ford cars and can be used on any other car or on trucks. Can be attached in a few minutes without drilling holes. It will fit any width and height of frame, being I beam construction, with rods double nutted. Weight, 10 pounds.

Manufactured by the Continental Auto Parts Co., Knightstown, Ind. Price \$2.75.

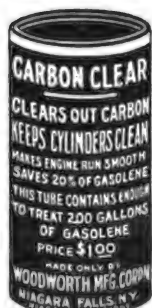
The Akron-Williams Rag Roller meets a demand from tire factories and large repair shops. It affords greater accuracy and speed in unwinding the wrappings around inner tubes after curing. The mandrel and tube are placed before the rag roller, with loose end of rag in contact with roller, then the power is applied and the rag quickly rolled off the mandrel and on to roller. The rag may be removed with ease after lifting the small rod up to hook at the top. This new roller takes up very little space and may be installed on a bench or any other convenient place near the machine for



wrapping tubes. The price is much less than the old style rag rollers and it is being adapted by many shops.

Manufactured by the Williams Foundry and Machine Co., Akron, O. Write for prices and literature.

Woodworth Carbon-Clear is a powder that is dissolved in the gasoline and which the makers claim, results in the elimination of carbon deposits from the cylinders and prevents further accumulations. One teaspoonful of the powder is used to five gallons of gasoline and one tube contains 40 teaspoonfuls or enough to treat 200 gallons. It is claimed that



this amount of gasoline will give as much as 250 gallons when treated with Carbon-Clear, which contains no acid, ether, alcohol or other ingredients that will clog the carburetor or harm the motor. It can also be used in kerosene or distillate.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Price, \$1 per tube.

The Premier "Its-It" Vulcanizer is one of the simplest devices for the purpose on the market and has nothing on it that is liable to become disarranged or to get out of order, there being only two parts. The heating disc has a long, flexible cord and plug attached to fit any light socket on the car and is fixed in a clamp to hold it in position. The operator simply connects with light socket; places tube in position with patch; switches on current and shuts it off in ten minutes when the vulcanization is thoroughly completed. Weather conditions have no effect upon its operation, having no exposed flame and no "extras" have to be carried to provide the heat. "Its-It" is furnished complete with clamp, heating unit, flexible cord and plug, and 12 patches all packed in carton with full directions. It



is made for six and 12-volt currents, the six-volt type being standard. When ordering voltage required and whether single or double contact Edison (push and turn) connecting plug is desired should be specified. Immediate deliveries.

Manufactured by the Premier Electric Co., 4032-4042 Ravenswood Ave. Chicago, Ill. Price, \$1.50.

Blaxshine is jet black and of excellent covering quality, producing a black, durable finish with a shining surface like a new car fresh from the factory. The makers claim that it will stand up under any degree of heat, being especially adapted for re-enameling hoods, radiators and metal running boards. It can be put on by anyone after the car is cleaned and the enamel will dry during the night,



leaving the car ready for use the next day. The package includes Blaxshine for one car, fine vulcanized brush, painter's cup, mineral wood, sandpaper and your personal monogram in gold shipped by post in corrugated paper.

Manufactured by the Twin City Varnish Co., 208 N. Wabash Ave., Chicago, Ill. Price, \$2.85.

CARE OF THE COOLING SYSTEM.

The average motorist spends little time in trying to maintain the running efficiency of his car. This is especially true in caring for the cooling system, which is more important than the average motorist thinks, yet it is generally neglected. If the cooling system is not kept clean and free from leaks it impedes the efficiency of the engine and increases its cost of operation.



The Northwestern Chemical Co. of Marietta, O., makers of the Norwesco line of "Chemically Correct" automotive equipment, have issued a 20-page booklet entitled "Care of the Cooling System."

This booklet is illustrated and conforms to its title, giving the motorist many practical suggestions and valuable information which will assist him in giving

(When Writing to Advertisers, Please Mention The Automobile Journal.)

proper care to the cooling system. A copy of this booklet can be secured, postpaid, by writing the Northwestern Chemical Co., Marietta, O.

The Manley General Utility Garage Crane combines a half dozen different tools into one and may be used for a hundred different purposes in the garage and outside on the road. It can be mounted on a truck, chassis or service wagon for use as a general wrecking crane, or if no truck is available it may be taken apart and placed in a touring car and at the scene of the wreck may be set up in five minutes by two men. It takes up little room when in use. As a portable floor crane it will lift the front and rear ends of automobiles or transport any piece such as the engine, transmission, etc., on



its own wheels anywhere. Its capacity as a floor crane is 1½ tons; as a wrecking crane, two tons.

Manufactured by the United Engine and Manufacturing Co., Hanover, Pa. Write for prices and literature.

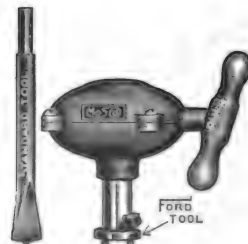
Eureka Grinding Compound is made to be safely used on any gasoline engine and the choice of three grades is given: Fine, medium or coarse. It is also put up



in one-pound cans, which are of the compression type, absolutely air tight.

Distributed by J. H. Faw, Inc., 37 Warren St., New York City. Write for prices.

The Mosco Valve Grinder works on an extremely simple principle. As the larger part of the grinder is held in place the handle at the side, which is attached to a chain coiled on a pulley inside the casing, is pulled slightly. The motion imparts a rotating motion to the valve tool



and the makers claim a noticeable increase in valve grinding time. The device is fitted with two tools, one standard, the other for Ford valves.

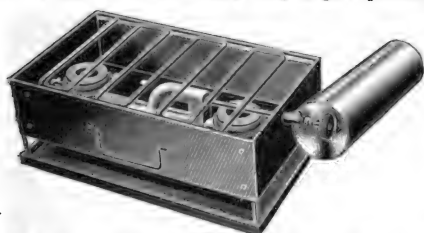
Manufactured by Motor Specialties Co., Waltham, Mass. Price, \$2.



Hercules Tops for Fords are always prepared for any kind of weather. All the materials used are carefully selected and well seasoned. The top is covered and the curtains made out of 34 ounce tan back auto rubber. Skeleton type top with natural wood bows. The rear side window is stationary and is fitted with double strength glass. The curtains above the doors roll up, working on a patented roller device and can instantly be raised or lowered. The centre metal posts on either side are attached to the Ford top irons and locked on inside of top and can be removed in about two minutes. These posts can be carried under the seats. The net weight of the touring top when crated is 200 pounds.

Manufactured by the **Hercules Buggy Co., Evansville, Ind.** Write for prices and literature.

The **American Folding Camp Stove** is just the thing for the camping or touring trip. It is efficient and dependable. Equipped with two powerful burners it uses gasoline, burning equally well outdoors as indoors. Weighing eight pounds



its size folded is $3\frac{1}{2} \times 8 \times 14$ inches. It is simple and easy to operate, as there is nothing to set up or assemble. It can also be supplied with heating drum. Good deliveries.

Manufactured by the **American Gas Machine Co., Albert Lea, Minn.** Write for prices and literature.

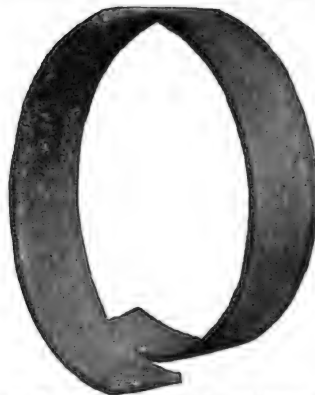
Bubbling Fountains may be attached to the municipal water supply in any garage and they are made in a number of styles, plain or ice cooled. The wise garage man looks to the comfort of his em-



ployees for he realizes that as long as they are satisfied they will do their best work for him. The illustration shows style number 604, which is arranged to take 75 pounds of ice.

Manufactured by the **Manufacturing Equipment and Engineering Co., Framingham, Mass.** Write for prices and literature.

Rusco Brake Lining is manufactured by specially constructed machinery. The basis is selected long fiber pure asbestos, expertly interwoven with tempered brass wire. No cotton or copper filling is used. This makes an extremely durable, but



soft and flexible fabric of uniform quality throughout. A secret compound is used to permeate the brake lining and render it impervious to water, oil, heat and dirt.

Manufactured by the **Russell Manufacturing Co., Middletown, Conn.** Write for prices and literature.

The **New Era "Better" Strapless Tire Holder** is an improvement over others of similar type. The construction is steel throughout with no cast parts to break and no straps to wear out or be lost. The locking device is part of the holder. No chains or cables are necessary to lock casing in place, to rattle or get lost. The tire supports are part of the holder and no unsightly straps are needed to support the tire, wear it out or permit it to be stolen. It is easy to slip the tire in place and push into position, the whole operation done in less time than it takes to fasten straps. Self-expanding, carrying



rim furnished where demountable rims are not used. It is quoted as No. 302 in appended price list.

Manufactured by the **New Era Spring and Specialty Co., Grand Rapids, Mich.**

No. 300 single.....	\$2.00
No. 301 double.....	\$3.00
No. 302 carrying rim.....	\$1.50

West of Denver add 10 per cent.

Woodworth Kant-Skid Cross Chains are designed for use with the Weed type chains and are so made as to present a perfectly smooth rounded surface to the tire that does not injure the rubber and presents the sharp edges of the metal



towards the road so as to give excellent traction to the wheels.

Manufactured by the **Woodworth Manufacturing Corporation, Niagara Falls, N. Y.** Prices: 3 or $3\frac{1}{2}$ inch, 15 cents each; 4 or $4\frac{1}{2}$ inch, 18 cents each; 5 or $5\frac{1}{2}$ inch, 22 cents each.

The **Krom-Nik Anderson Special Gear** for Ford cars offers the lowest possible ratio for hauling and hill climbing. It has a special type of tooth unlike any other and with an additional half pound in weight it gives remarkable strength and efficiency. The 4.2 to 1 ratio offers



the lowest gear reduction possible in a Ford axle. The special racing 3 to 1 gears manufactured by this company are designed for owners who want extremely high speed for use in racing cars.

Manufactured by the **F. H. & S. Co., Chicago, Ill.** Price, \$15.

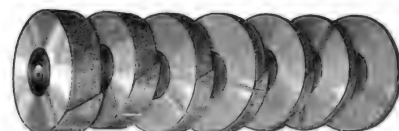
The **Storm Light Weight Pistons** are made of a special close grained semi-steel metal. They are made as light as is practical, often as much as 50 per cent. lighter than the original pistons furnished by the manufacturer. Yoke shaped reinforcements are used to provide ample strength combined with lightness. This light weight is a most desirable feature,



reducing vibration, stress and wear. They are finished to size with extreme accuracy, can be fitted closely and therefore are very durable. A motor provided with these pistons will give the longest and most economical service.

Manufactured by the **Storm Manufacturing Co., Thompson, Ia.** Write for prices and literature.

Aloxite Cloth, which is rapidly succeeding the old time emery cloth for general machine shop work, is put up in economy rolls as well as in reams, sheets and rolls.



The cloth is cut in $\frac{1}{8}$, $\frac{1}{4}$, 1, $1\frac{1}{2}$, 2 and $2\frac{1}{2}$ inch widths, snugly wound upon spools. The operator simply cuts off a piece in any length or width he desires. The rolls are 50 yards long and are made with any degree of grit. Aloxite Cloth is also furnished in 9x11 inch sheets.

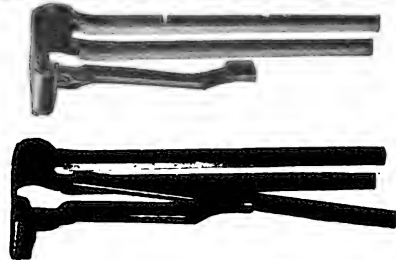
Manufactured by the **Carborundum Co., Niagara Falls, N. Y.**

Harvey Springs have been so well proven by actual experience that there is absolutely no question in the minds of garagemen and car owners as to their pre-eminence in strength, resiliency, endurance and all around dependability. There is a Harvey jobber with a large stock of Harvey springs on hand in every state in the Union, and it is his business to see that your order is filled and shipped by the fastest route whenever you call.

Harvey Spring and Forging Co., Racine, Wis. Write for copy of Spring Book, giving valuable information.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

The Auto-Scope Windshield Wiper cleans both sides of the glass at the same operation. The inside wiper is made of heavy absorbent felt, yet not so heavy as to cause undue friction and drag. The outside wiper is made of the best grade squeegee rubber, guaranteed not to scratch the glass. The whole device may be placed either at the top or between the glass sections of the shield, since it requires but 1/16 of an inch clearance.



It is made in three models: The Auto-Scope Junior with no rear wiping member, finished in black enamel; Auto-Scope No. 1 in oxidized finish for both front and rear of glass, and the Auto-Scope No. 2, designed similar to No. 1, but made of steel, heavily coppered and nickel plated. Deliveries in 30 days.

Manufactured by the White Lock Co., 1241 Michigan Ave., Chicago, Ill. Price, Junior, \$1; No. 1, \$1.50; No. 2, \$2.

Evr-Lastin Gear Compound is a gear and chain lubricant that is the result of many years experience in developing lubricants. It is composed of five products that make a strictly distinct lubricant for the lubrication of transmission and differential, bevel, spur or worm gears. It is dark in color and very tenacious and it clings to the surface of the metal under heavy pressure. The makers claim that it is only necessary to pour into the gear housing one-third the quantity of this



lubricant that is ordinarily required and thus a large saving is accomplished. Furthermore, it is claimed to last pound for pound, three or four times as long as the ordinary transmission oil or grease. Prompt delivery from stock.

Manufactured by the Imperial Oil Co., St. Louis, Mo. Prices: 5-pound tins, \$1.50; 10-pound tins, \$2.75; 25-pound tins, \$6.50; 50-pound tins, \$12; 1/2 barrel (wood), per pound, 22 cents; barrels (wood), per pound, 20 cents; 1/2 barrel (steel), per pound, 24 cents; barrels (steel), per pound, 22 cents. Special discounts.

Eagleine Motor Oils and Gear Oil. Lubricating oil for internal combustion engines must be of the proper consistency, so that it flows freely and holds its viscosity, with a certain percentage of the resistance particles of the natural oil extracted and yet not too great a percentage of the lubricating base of the natural mineral oil removed, which gives it its quality for efficient lubrication. To ascertain the proper proportions in the refining of as near perfect a lubricant for gasoline engines as possible requires long years of experience. Eagleine motor oils were put through the most exhaustive tests for a period of 20 years and now have reached the zenith of perfection. They are refined from the natural mineral oil and contain no animal or vegetable



fats that tend to decompose into glycerol and acids, which lower the lubricating efficiency. Eagleine gear oil is especially compounded to the exact consistency for efficient lubrication of transmission and differential gears and its use has shown that there is less wear on the gears and thereby upkeep expense is reduced to the minimum.

Eagleine motor oils and gear oil are put up in the company's trade marked containers that serve the purpose of cleanliness and convenience in use, as well as assuring the customers no spurious substitutes.

Eagleine motor oils and gear oil are prepared and marketed by Eagle Oil and Supply Co., 44-5-6 India St., Boston, Mass.

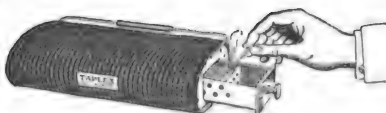
The "New Britain" All-Steel Bench Drawer is designed to meet the needs of those whose requirements do not demand the wooden back, bottom and front. A hem of triple thickness around the upper



edge and the welding of all joints combine to produce a drawer of remarkable strength and durability. With the common type of bench now almost universally used, having a thinner back plank than front one, an open space is left between the back plank and the ordinary type of drawer invites pilfering. In this drawer, however, a solid sheet metal top, prohibits any tampering at the rear and prevents a block or a lockout through wedging of the contents. In addition it serves to exclude any oil or water that might by accident soak through from above. The slideways are integral with the top and give to the drawer a smooth, free movement without binding or a cramping tendency. The handle is of generous size, with a shape of special design, which affords a very comfortable hand hold. A cylinder lock of good grade with two individual keys is provided. Master keying may be had if desired at cost. The drawer is sold as a unit, requiring no fitting, easily installed and quickly inserted without any cutting of bench. Weight in shipping order 40 pounds. Prompt deliveries.

Manufactured by the New Britain Machine Co., New Britain, Conn. Price, \$7.50.

The Taplex Foot Warmer is for use in the automobile, camp, porch, and for all other outdoor uses. On the coldest days it gives one that full measure of comfort



and protection which makes the automobile ride a pleasure. It is lighted with a match and the fuel burns without flame or smoke, thus making it absolutely safe. The case is made of indestructible steel

with nickel plated ends and a double asbestos lining.

Manufactured by the Taplex Corporation, 47 West 34th St., New York City, N. Y. Weight 5 pounds. No. 14, \$5; No. 20, \$7.50. Extra fuel, 12 bricks to a box, \$1.

The Long Horn shown in the cut is both ornamental and durable. The contact between the diaphragm and the rotor is made by steel rollers inserted in the rotor, which is of hardened steel. Their action on the diaphragm gives a rolling tone peculiar to the Long Horn. The volume of sound may be varied from a long, low rumble to a loud, sonorous crash, and continues after power impulses have ceased. It is finished in three styles: All black, black and nickel and black and brass. To-



tal length, nine inches. Length of bell, 6 1/4 inches. Fair deliveries.

Made by Edward A. Cassidy Co., Inc., 280 Madison Ave., New York City. Model 3, \$3.50.

The Comer Auto-Stop Signal, an invention by Mr. G. Comer, a conductor on the Illinois Central, understanding the efficiency and positive dependency of the semaphore signal of railroad block system, conceived the idea that such a device properly operated and installed upon a motor car would solve the "safety first" problem and especially eliminate all possibility of not signaling if operated automatically. The device is attached to the tall light post or license bracket and a coil cable with strand pull cable passing through a lever attached by six screws to the floor board of the tonneau under the car, from the lever bracket a heavy



strand cable is bolted to the foot brake rod by means of a lock bolt. The slightest pressure on the service foot brake takes up the slack and before the brake bands tighten up to the point of slowing the car down the red semaphore arm raises to a horizontal position, thereby immediately and automatically giving a signal to the man behind. Provision for night operation is provided by an electrical bulb (two candle power) installed within the housing of the semaphore arm and by means of a contact screw inside the axle of the semaphore when coming to a horizontal position automatically makes contact and lights, signaling the word "Stop" brilliantly illuminated to the man behind and which can be seen and read for 300 feet. Immediate delivery.

Eastern Sales Agents, Bucyrus-Eastern Sales Co., 201 Devonshire St., Boston. Manufacturer's Agents, Wonder Sales Co., 616 Hippodrome Bldg., Cleveland, O. Price, \$15.

(When Writing to Advertisers, Please Mention The Automobile Journal.)

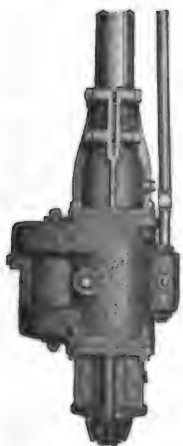
The Advance Automobile Accessories Corporation is introducing a transmission lining for Ford cars that can instantly be identified by a white stripe running along the center. In a folder headed "Another Triumph of America's Genius," this lining is described as setting a new standard in transmission fabric quality. A treatment has been worked out by the chemists of the Advance institution which resists and neutralizes the action of hot oil on cotton fabric. Moreover, a mechanical method of applying the treatment to the woven fabric also has been successfully developed, with the result that White Stripe solution thoroughly saturates every fiber of the lining, making it retain its heat and oil resisting qualities longer than any lining now on the market.



White Stripe Lining is to be marketed both in rolls and strips of three to the box. The retail price per box of three, east of the Rockies is \$2, and from the roll the retail price is 32 cents per foot.

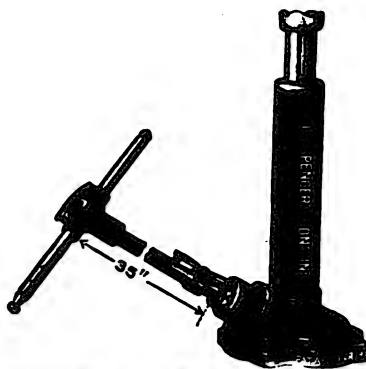
Manufactured by the Advance Automobile Accessories Corporation, 56 E. Randolph St., Chicago. Write for prices and literature.

The Moore Transmission is merely a matter of increased leverage; as, for instance, it is easier for a man to lift a given weight with a lever 20 feet long than it is with a lever 10 feet in length. Due to this steady flow of power the strain on the engine mechanism is very much lessened because the impulse of the engine is blended thoroughly before the power is transmitted to the back wheel.



As all parts of the transmission are properly designed and machined there is no difficulty in installing. Roller bearings are used throughout and are easily obtainable for replacement purposes and are the bearings which have been found most satisfactory for Fords. This transmission enables the driver to adapt his car to any kind of road conditions from paved streets to mud holes, deep sand and hills.

Manufactured by the Tractor Train Co., 1346 Wall St., Los Angeles, Cal. Write for prices and literature.



The Acme Automobile Jack may be operated from the end of the longest car without soiling the clothes, the outstanding features being ball thrust bearings and a large base area. All working parts are enclosed in a dirt and grit proof case and they run in heavy grease. The lift screw is $\frac{3}{8}$ of an inch in diameter.

Manufactured by I. S. Spencer's Sons, Inc., Guilford, Conn. Price \$6.50.

Carborundum Valve Grinding Compound is one of the standard products proved by time. This product is made to be safely used in any gasoline engine and the choice of three grades is given, coarse, medium or fine. It is put up in from one

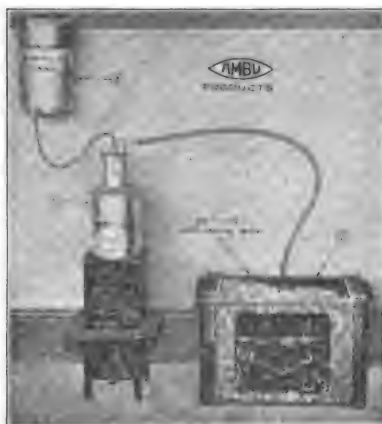


to five-pound cans and is growing more popular with discriminating manufacturers, engineers, garage dealers and repair men.

Manufactured by the Carborundum Co., Niagara Falls, N. Y. One pound can, \$1.25. Five-pound can, \$5.

The American Bureau of Engineering has just put a product on the market called the Peers Ambu Battery Steamer, an apparatus for softening the sealing compound on starting and lighting batteries.

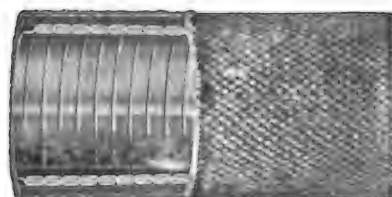
The device consists of three parts: A steam generator, a steam box and a water supply tank. When a battery is to be opened the connectors are first removed and the battery then placed in the steaming box and steam passed into the box for about 15 minutes. This makes the sealing compound soft, so that it can be removed readily with the point of a screw driver, or putty knife, the entire operation of opening the battery being performed within five minutes after it is removed from the steaming box.



The generator or boiler is made of heavy galvanized iron, the water in this unit being automatically kept to a low level so that steam is generated very quickly.

Manufactured by American Bureau of Engineering, 1018 Wabash Ave., Chicago, Ill. Write for prices.

"Triplex" Gasoline Hose uses the highest quality hose cord in its fabric cover, which is woven on with a circular loom, laying the fabric on the rubber under a pressure of 330 pounds to the square inch, so that it bites right into the rubber, which is pressed still closer around the metal lining. This metal lining, the makers claim, is the most flexible construction ever devised. The steel strip is



made of best quality slow-rolled metal of accurate, uniform thickness and heavily electro galvanized, forming a gasoline hose that is non-leakable and durable.

Manufactured by the Metal Hose and Tubing Co., Brooklyn, N. Y. Write for prices and literature.

The Roedding Signal Tail Light is housed in a cylindrical shaped metal case, 10 inches by four inches. The makers claim it to be the simplest of the many signaling devices upon the market. Its operation is controlled by a toggle button mounted upon the steering column. When the button is pressed in the central position the horn is blown. When pushed to



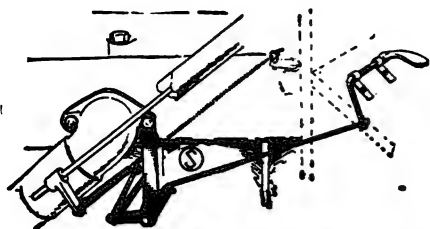
the right the letters "right" appear, two inches in height on a roller, which is inside the water proof case. When pressed to the left the letters "left" appear and other positions signal "stop" and "back," showing accurately the direction the driver intends to take.

Sole distributor, K. G. Barkoot, Detroit, Mich. Price, \$18.

Woodworth Lock Chains are ideally designed for locking spare tires to the holders or for locking the front wheel to the frame to prevent the car from being stolen. They are steel chains covered to prevent chafing the paint and are fitted with locks for connecting the ends. Prompt deliveries.

Manufactured by the Woodworth Manufacturing Corporation, Niagara Falls, N. Y. Prices: Leather covered, case hardened, with high grade lock, \$2.50 to \$2.75; same without lock, \$1.10 to \$1.25; imitation leather covered steel chain with high grade lock, \$2 to \$2.25; same with cheaper lock, \$1.40 to \$1.65; same without lock, 45 to 50 cents; black coated drill covered steel chains with good cheap lock, 65 to 75 cents; same without lock, 35 to 45 cents.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



The Stewart Foot Accelerator is designed for the Ford car and can be actuated with a minimum amount of effort. This device is extremely simple to apply and requires no alterations in the present machine, except the boring of a three-quarter inch hole for admitting the foot lever. The accelerator may be placed in any convenient place on the floor boards or dash and with the exception of the pedal all parts are located out of sight beneath the hood.

Manufactured by F. W. Stewart, 1402 Michigan Ave., Chicago, Ill. Write for prices.

Roll-Rite Ball Bearings for Fords and Chevrolets automatically take up the side grinding or side thrust movement and dissipate it into a moving anti-friction ball bearing, and by so doing not only prevent side grinding, but allow the present bearings to continue to function properly. A set contains four complete bearings, two of which fit perfectly into each front wheel in conjunction with the present bearings, thus giving four bearings to each wheel, and are in contact with the present bearings, only a felt washer and metal container being removed. The



balls in this bearing are held in place by rivetless metal retainers, causing a perfect alignment, preventing crowding together, and allowing each ball to operate independently of the others.

Manufactured by the Roll-Rite Manufacturing Co., Charleston, S. C. Write for prices and literature.

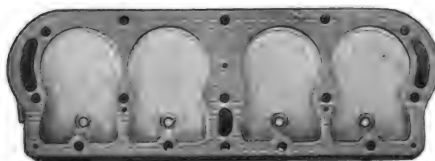
The Gordon Sectional Overlap Lazyback Seat Cover makes a good fit under all conditions. The section to cover the back of the seat overlaps on each of the arm rest sections and is greater or less as the case may be. A misfit is impossible the makers claim, the lacing at the bottom preventing wrinkles, as should one appear the lacing is again adjusted to the proper tension. The overlap relieves all strain



on fabric and fastening because of its flexibility permitting each section of the cover to conform to the movements of the upholstery without strain.

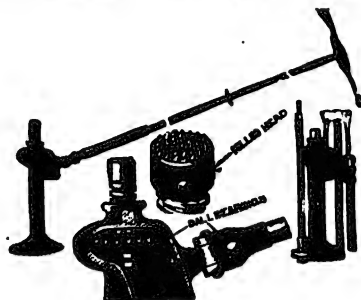
Manufactured by the J. P. Gordon Co., Columbus, O. Write for prices, samples and literature.

Never-Leak Gaskets combine two standard cylinder gaskets made of copper with a layer of asbestos fabric between the surfaces. These gaskets are carefully made and reinforced at the vital points. They may be obtained for a great number of standard cars and are cut to fit, requiring no alterations. The same firm also manufactures gaskets for practically every part of the engine where packings are necessary.



Manufactured by the Fitzgerald Manufacturing Co., Torrington, Conn. Write for catalogue and prices.

The Kimball Ball Bearing Heavy Type Jack eliminates dirty, hard jack work. Its long handle turns and raises or lowers the heaviest car with ease. Its rigid handle that is swung from the top, not the bottom, prevents it from falling over while being placed beneath the car and all the raising or lowering is done at the



Kimball Jack

end of the long handle. The milled head of hardened steel on the top will hold anywhere, on any bolt, spring or clip. The ball bearings carry the lift and thrust, reducing the friction and making the jack work easily. There is nothing to get out of order and the entire jack folds up into a small bag. Prompt delivery.

Distributed by Edward A. Cassidy Co., Inc., Madison Ave., at 40th St., New York City, N. Y. Write for prices and literature.

The Williams Solid Reducing Shell enables the repair man to use larger sectional molds for vulcanizing repairs on small casings, whenever the small molds are busy, by lifting a shell into a large mold.

The shells being machine finished to a minute degree of accuracy and being in perfect contact at all points, as good a cure is secured as by direct contact of tire with mold.



These shells enable the repair man who has various sizes of molds to double the amount of vulcanizing on small size tires.

Manufactured by the Williams Foundry and Machine Co., Akron, O. Write for prices and literature.

The Howe Searchlight Display Stand shown in the accompanying illustration is a familiar sight in the stores of the many dealers that handle the Howe products. It is handsomely lithographed in red, white, blue, gray and black, and provides space to show styles of the regular Howe Searchlights No. 9 and No. 5, retail price \$6.50 and \$5.50 respectively, and also

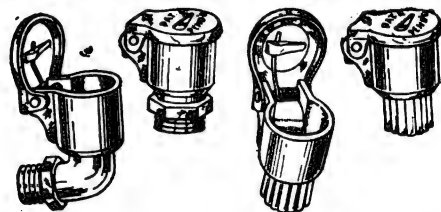


the Howe Junior, a single shell, popular priced Howe model selling at \$4.50. On this stand are displayed also six of the seven clamps by which the bracket of the Howe is attached to any windshield frame, round, square or oval, with a perfect grip.

This display stand for counter or window display, together with a set of windshield clamps, is furnished free to Howe dealers. This practical connection between national advertising and the retail dealer has resulted in a great deal of interest and to it a large number of sales have been directly traced.

Manufactured by the Howe Manufacturing Co., Chicago, Ill.

Rex All Enclosed Oil Cups have many special features and are designed to meet all needs and incidentally overcome the many objections to the old style cups. They are made with a one-piece shell and easily opened and self-closing cap or lid.



which is actuated by a spring, which is enclosed without obstructing the bore. This spring being constantly lubricated it will not rust or stick. The cups are dust as well as rain proof and may be painted without affecting the mechanism or action. They are made in all sizes and are guaranteed as to construction and action.

Manufactured by Frank X. Devlin, 100 Warren Ave., East, Detroit, Mich. Write for literature and prices.

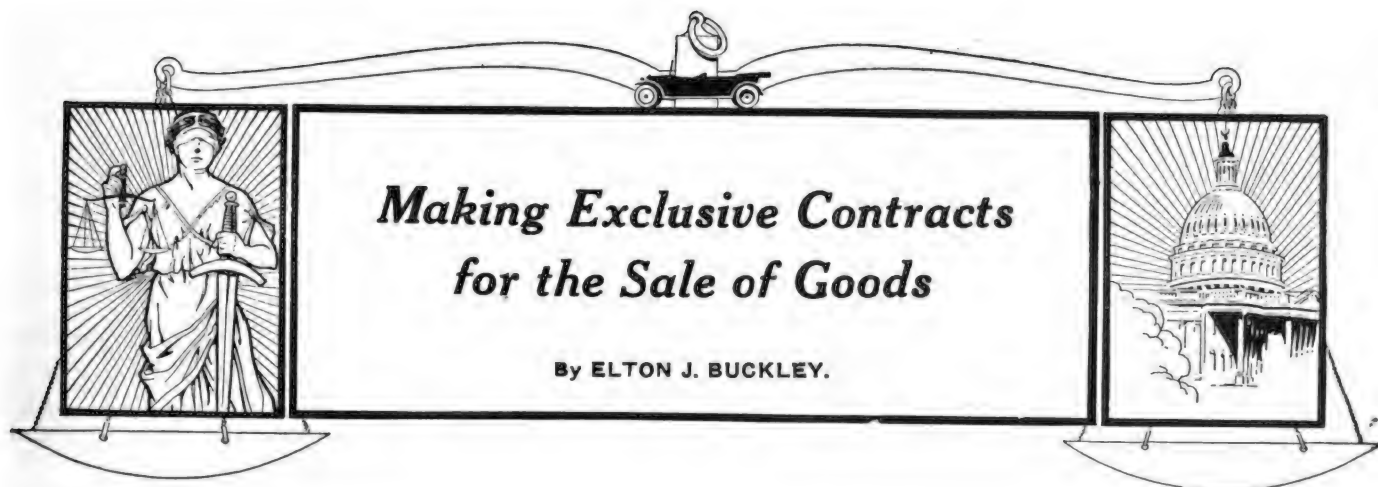
Simplex Grease Gun loads and ejects grease in 30 seconds. It is simple to remove the lower cap, insert the gun in the grease and pull up the plunger. Slip off the outer sleeve and the gun comes out as clean as a whistle, all the superfluous grease being left on the outer sleeve. The gun itself can be handled without the



least danger of soiling hands or clothing. Deliveries in 20 days.

Distributed by the Hinrichs Manufacturing Co., Chicago, Ill. Price, \$2.50.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



Making Exclusive Contracts for the Sale of Goods

By ELTON J. BUCKLEY.

Here is an interesting communication regarding the legality of limited sales contracts:—

Tyler, Tex.

I beg to hand you inclosed herewith all papers relative to an order for _____, the exclusive sale of which I accepted for my city and placed an order for the same through a Dallas (Texas) jobber, who also has the exclusive sale of this article for the State of Texas. At least when I placed the order with the factory salesman, who was in company with a salesman for the jobber, I was told by the factory salesman that the jobber had the exclusive account for Texas.

Attached to the inclosed papers is a letter from the jobber, which, in a way, declines to acknowledge the exclusive sale contract. They are honorable jobbers; I have had quite a lot of dealings with them and know they are very conscientious.

Now the question that is interesting me is, can I legally make a contract that will absolutely protect me in the sale of a line of goods like this one? If I go ahead and faithfully comply with my agreement to the letter, can I collect damages from the concern making the contract with me when other merchants are allowed to get the goods either direct or through jobbers?

I base my conclusion that such contracts are legal on the fact that I am at the present time, and have been for many years, handling the exclusive selling agency for three lines of goods in my store, and although several attempts have been made by both jobbers and retailers here to bring prosecutions against the concerns with whom I have contracted for these exclusive sale lines, nothing has ever been done by legal proceedings that has interfered with me in the handling of these goods.

Quite a little while ago I handed to the manager of one of our local jobbing concerns an article that appeared in one of our trade journals of a sister state showing a Supreme Court decision that where a jobber had refused to sell to a merchant other than the one with whom he has placed his line in an exclusive sale way, and the case was decided in favor of the defendant, the court saying that any firm or corporation owning goods or other things of value, had a perfect right to sell the same to any one to whom they pleased, or they could refuse to sell to any one if they wished to do so.

When the jobber refused to regard the exclusive sale order, I wrote him protesting, and have a reply stating "we would carry out the arrangement with you to the letter, except for the fact that we cannot legally enter into an exclusive sale contract under our state laws."

S. V. G.

The question is: Can a manufacturer or jobber legally make a contract giving a buyer the exclusive right to sell his product in a given territory?

The answer is: He can, if the article involved is in regular commerce, not monopolized by anybody. He can do it with coffee, or tea, or muslin, or sewing machines, or a brand of clothing or an automobile. He can do it anywhere in the United States, including Texas, though the law of that state on the subject is somewhat mixed.

The only state in the Union, so far as I know, which has a statute forbidding exclusive sales contracts is Texas, but the courts don't all seem to follow it. In one case involving the sale of a brand of beer a Texas court held an exclusive contract void under the act which declared that "any agreement or understanding to refuse to buy from or sell to any other person any article of merchandise, produce or commodity, is a conspiracy in restraint of trade."

But in another case in Texas, also involving the sale of a brand of beer, another court held that it was not illegal under the very same act.

No other state has such an act, so far as I have seen, and the general law on the subject is accurately expressed by the following decision in an automobile case, which holds, incidentally, that such contracts aren't even against the law of Texas:—

The Cole Motor Car Co., an Indiana corporation, entered into a contract in Indiana with a citizen of Texas for distribution of its car in certain designated counties in Texas. The contract provided for invoicing to the distributor at prices fixed in advance by the company, and a commission to be paid to the distributor on each car sold. The contract also contained a clause to the effect that the distributor should have the "exclusive right to sell Cole motor cars" in the territory named. In a suit against the distributor for a balance due on cars delivered to him, a defense was set up that territorial restriction in the contract rendered it void as violative of the Texas anti-trust law. It held that the transaction constituted a consignment, involved interstate commerce and must be determined by the anti-trust laws of the United States rather than the anti-trust laws of Texas. The conclusion is reached that neither of these laws is violated. The agreement did not restrict trade. There are a multitude of other companies from whom purchasers can readily obtain motor cars varying in little, if anything, from the perfectibility of the car made by the plaintiff company. It is common knowledge that most, if not all, of such motor companies avail themselves of similar arrangements.

It is clear, then, that A, a manufacturer in New York state, and B, a dealer in Pennsylvania, can enter into a legal contract by which B is to have the exclusive right to sell A's product in B's territory. There is not the slightest doubt about the perfect legality of such an agreement, provided no monopoly is involved. Monopoly doesn't mean a monopoly of a brand—every owner of a brand has that—it means monopoly of the entire supply of a commodity. There would be a monopoly if a manufacturer making and controlling 90 per cent. of all automobiles made in this country should make exclusive sales contracts.

The Cole motor case was decided under the Clayton anti-trust act, the latest national law against restraint of trade. The Clayton act provides that it shall be unlawful to sell on condition that the buyer shall not sell competitive goods, "where the effect may be to substantially lessen competition or tend to create a monopoly in any line of commerce." But in another section the Clayton act protected exclusive sales contracts which did not restrain trade by saying, "nothing herein contained shall prevent persons engaged in selling goods, wares or merchandise in commerce from selecting their own customers in bona fide transactions not in restraint of trade."

So much for exclusive sales contracts made between parties in different states and thus under Federal law. As to the status where the parties making such contracts are in the same state, I believe it is equally clear that A and B could make a legal contract if they were in the same state, though as I have said, the law in Texas is not uniform. There are many cases which say so, and practically none that say the contrary, unless there is some evidence of an intent to build up a monopoly, not of the brand, as I have said, but of the general supply of something.

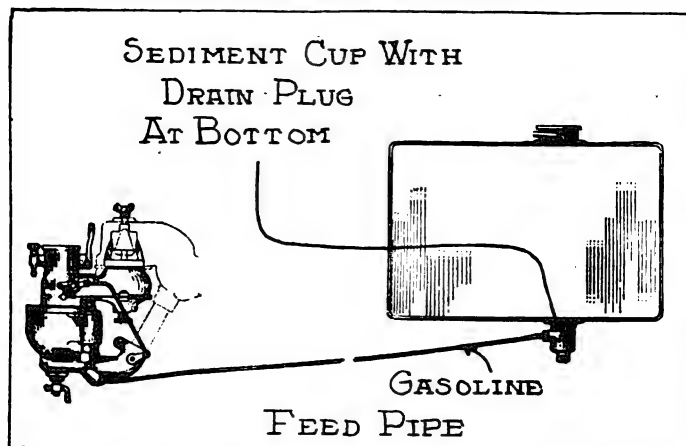
In other words, a man has a complete monopoly of "silver" corn, or "nobby" clothes, or the "Ford" automobile. He can sell whom he likes and as many or as few as he likes. Nobody can question his right to do so, where the only trade he restrains is the trade in his own brand.

(Copyright, October, 1918, by Elton J. Buckley.)

Standard Gasoline Feed Systems

THE following discussion of the several methods by which gasoline is fed to the carburetor is not intended to draw critical comparisons between the systems in vogue, but rather to acquaint uninitiated motorists with the principles of operation. The systems now generally used may be classified as gravity, pressure and vacuum.

The gravity system is based upon the law of nature that



Illustrating the Gravity Feed System of Fuel Supply.

liquids seek the lowest level. This system is extremely simple and a question often brought up as a consequence is, "Why is it not universally adopted?" If an automobile were always to travel on level roads it would prove the ideal method of gasoline feed, but inasmuch as there are steep grades to be negotiated there are several objections to its adaptation. This is because as the car climbs a steep hill the tank at the rear is lower than the carburetor and consequently the gasoline does not flow forward.

Early Systems Were Troublesome.

In the early makes of machines, when the storage tank was nearly always located in the rear, fuel feed troubles were very common; because of the distance between the tank and the carburetor it required only a slight grade to check the gravity flow. The trouble has been generally overcome by placing the tank further front, generally under the front seat, and when in this location only the very steepest of grades are apt to stop the flow of fuel.

With the advent of starting and lighting systems, space was needed for installing the storage battery and consequently some designers incorporated the tank in the dash, while others moved it to the rear of the chassis. Other reasons for many manufacturers changing the position of the tank are that the public desired more storage space and the tank could not be located sufficiently high on the underslung models. Advocates of this system state that simplicity and readiness are its chief advantages. The disadvantages are that the fluid is apt to splash through the vent hole in the filler cap and that when filling the tank, if any gasoline is spilled, it either runs on the seat, on the engine or down the side of the car.

In the accompanying illustration is shown a general type of gravity feed gasoline system. The tank is located under the front seat. The sediment cup or separator, shown at the bottom of the tank, serves for collecting foreign matter that would otherwise be carried along with the gasoline into the carburetor.

Designers who changed from the gravity system usually located the tank at the rear of the chassis, forcing the fluid to the carburetor by air pressure. Many methods are utilized to accomplish this end, but the principle involved is invariably the same. One of the first methods to be adopted was to utilize the pressure of the exhaust, but because of a great many difficulties this system gradually gave way to a positive air pump usually driven by the engine.

Illustrated herewith is the gasoline system used quite generally. It consists of a gasoline tank located at the rear of the chassis, a line leading from the tank to the carburetor,

a pressure pump on the dash and an air line that connects at one end to a power driven pump and at the other end to the storage tank. Two pounds air pressure is required to force the gasoline from the tank to the carburetor. This is obtained in two ways, either by the hand pump located on the dash or by the pressure pump operated by the crankshaft of the motor.

How to Use Hand Pump.

Under ordinary driving conditions the power driven pump produces sufficient pressure, but when fuel has been placed in the tank it will be necessary to use the hand pump to obtain the initial pressure. Before attempting to use the hand pump, the handle of the small cock located just below the pump handle must be turned to the right, so that it is pointing straight across the car. When the pressure has been raised to the desired amount, as indicated by the gauge located near the pump handle, the handle of the cock should be turned at right angles, so as to point downward. By turning the handle to the left so that it points directly across the car, the pressure in the tank may be reduced.

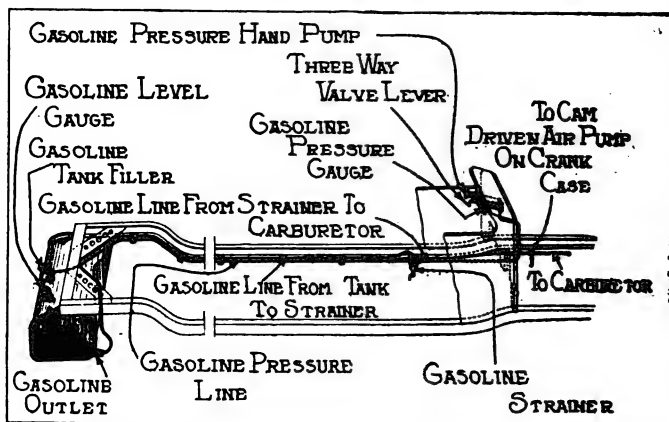
The air pressure system insures a positive feed to the carburetor regardless of the position of the car. Its only disadvantages are that the initial pressure must be produced by the hand pump and frequent inspection of the system is necessary to prevent air leaks.

The next and last system to be described is the vacuum feed, of which the Stewart is a good example. With this system the main storage tank is usually carried at the rear of the chassis, from which the fuel is transferred by suction to a small auxiliary tank near the engine. From here the fluid flows to the carburetor by gravity. The vacuum system is the latest development and is not difficult to understand, as the principles involved are but elementary.

Principles of Vacuum System.

In the accompanying illustration is shown the vacuum tank. It consists of two steel shells, the inner one of which contains the float and valve mechanism, attached to the cover. The inner shell is connected to the gasoline tank, the intake manifold, and is open to the atmosphere by means of a vent tube on the dash. The outer and larger shell connects only to the carburetor and the atmosphere. The two tanks are joined by a flapper check valve in the bottom of the inner shell.

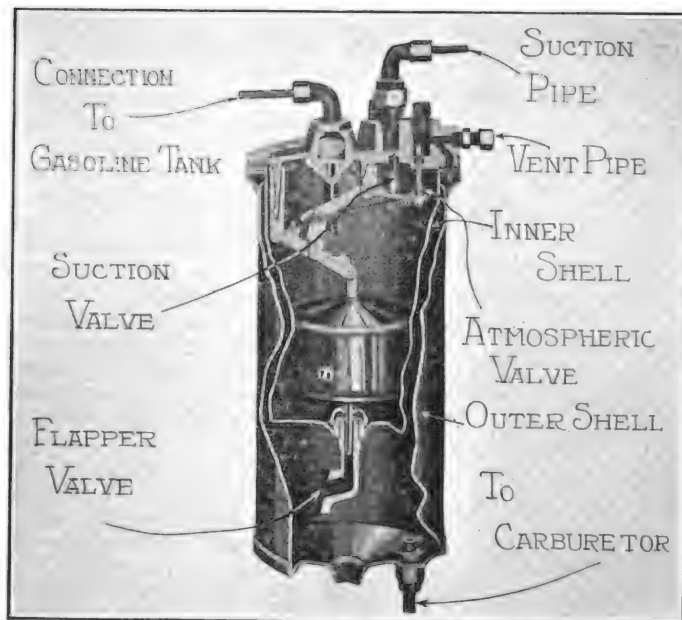
In operation, when the float is down, the suction valve is open and the atmospheric valve closed. The suction of the motor is now communicated to the inner shell, creating a partial vacuum, and drawing gasoline into the tank from the main reservoir at the rear of the car. As the tank fills the float rises, until at a certain point the springs close the suc-



The Main Features of the Pressure Feed System.

tion valve, at the same time opening the atmospheric valve. The gasoline which has been drawn into the inner shell now flows down into the outer shell through the flapper valve, and from there to the carburetor as fast as needed. When the inner tank is empty and the float down, the position of the valves is reversed, the fuel again following into the inner tank.

The action of the tank is entirely automatic. If at any time it should be filled to a point that causes the suction line to draw gasoline into the intake manifold, the trouble is most likely due to a leaky float. In that case the float will become



Components of Vacuum Tank of the Vacuum Feed System.

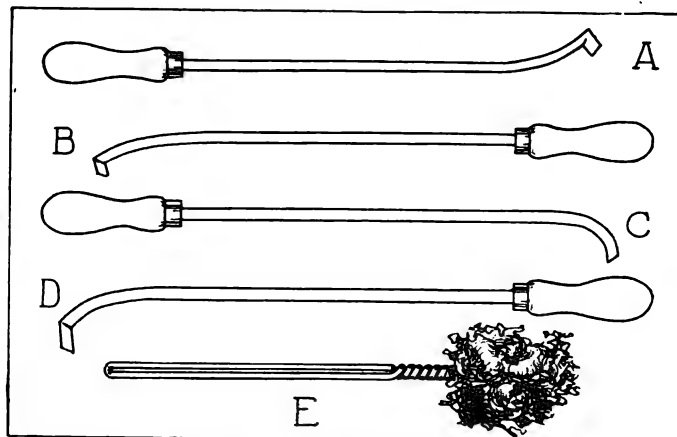
filled with the liquid and be too heavy to act, the result being that the suction valve is constantly open. The float should just be of sufficient weight to draw the operating lever, to which the springs are attached, past the center point. If not, stretching the springs slightly when they are too tight, or cutting a small piece from the end when they are too loose, will remedy the difficulty.

Suggestions for Proper Care.

To fill the tank, should it ever become entirely empty, close the throttle and allow the engine to turn over a few times with the electric starter. If in those circumstances it is impossible to fill it, prime with a pint or so of gasoline through the filler plug on top. The advantages of this system are that it combines the gravity and pressure feeds, allows more carrying space by placing the tank at the rear of the car, and affords a positive feed to the carburetor regardless of the level of the car.

CYLINDER CARBON SCRAPERS.

It is doubtful if one could develop sufficient pressure with a hand pump to expel the loose carbon from the cylinders. It is not absolutely necessary that air be used to force the carbon from the engine, this method being suggested because it is the simplest where facilities will permit its use. A sat-



A, B, C, D, Different Forms of Scrapers for Removing Carbon from Cylinders; E, Dry Waste Secured to the End of a Wire Will Assist in Removing Loose Carbon.

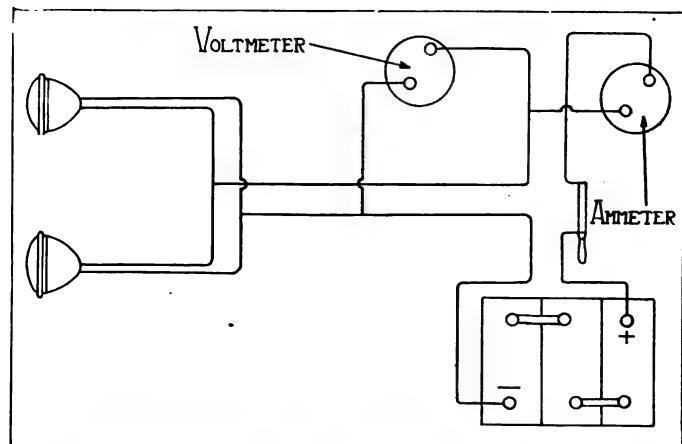
isfactory method is to fasten a piece of dry waste to the end of a wire and then rub it around the cylinder several times. The loose carbon has a tendency to adhere to the waste. By repeating this operation three or four times most of the carbon will be removed. The remainder will be forced out with the exhaust gases when the engine is running.

In the accompanying illustration are shown four different types of carbon scrapers. These can be purchased at any accessory store or if you are handy with the hammer you will be able to make them yourself. They consist of pieces of 1/4-inch steel, flattened and ground at the end and then bent to the desired shape. The scraping end should be hardened.

AMMETER AND VOLTMETER.

The ammeter is used for determining the condition of a dry cell by short circuiting it across the terminals for an instant. The internal resistance of dry cells is comparatively high and the chemical action comparatively slow. In the storage battery the conditions are the reverse, the chemical action is very rapid and the internal resistance very low when its elements are connected. Rapid chemical action is productive of heat. It should be borne in mind that in charging a storage battery there is a difference in potential between the negative and positive plates and if the plates were joined together the difference in potential would instantly become equalized. It is this process of equalizing that gives off the current and makes the battery useful. Thus it is desirable that the cells be discharged slowly.

An ammeter is of such low resistance that connecting it across the terminals of a storage battery would produce practically the same condition as directly connecting the plates



Wiring Diagram Incorporating a Voltmeter and Ammeter in the Lighting Circuit.

together. For this reason a voltmeter is used because it has high resistance.

Regarding the ammeters used in lighting circuits, you will note that the maximum reading of the scale is from 15 to 20, and that provision is made for registering the rate of charge and discharge. These instruments do not indicate the capacity of the storage battery, but instead register the amount of current being charged into or drawn from the cells. In the accompanying illustration is shown an ammeter and voltmeter incorporated in the lighting circuit. The voltmeter indicates the strength of the current, while the ammeter shows the amount being drawn for heating the lamp filaments. This amount is small in comparison with that capable of being supplied by the battery.

To fill holes in castings, etc., use a metal that expands instead of contracts upon cooling. One such metal may be made of nine parts lead, two parts antimony and one part bismuth.

To remove rust quickly from iron parts wash in a solution made of one part nitric acid, one part muriatic acid and 12 parts water. After washing in this the parts should be thoroughly washed and rinsed in clean water.

BEEMAN LIGHT GARDEN TRACTOR

A Type Designed for Cultivating Small Areas and Serve as a General Power Plant

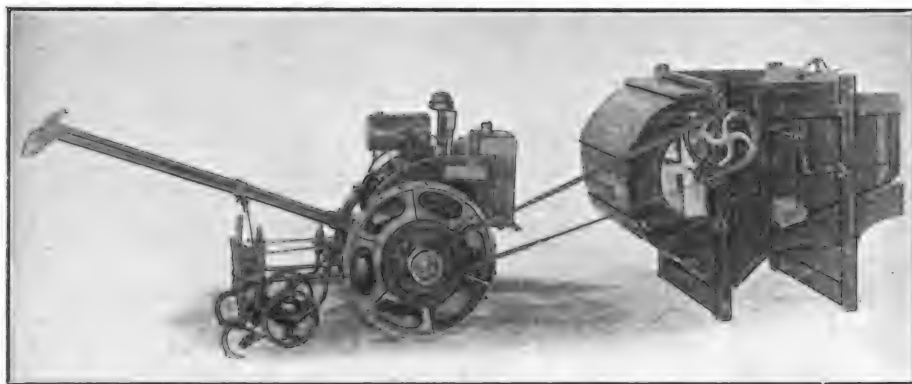
TRACTOR design is based primarily on the knowledge of the constructor or inventor of agricultural work. Its efficiency depends upon his ingenuity to adapt it to uses where power will conserve manual labor. The first farm tractors were built with the purpose of obtaining large power production for plowing, harrowing, mowing and

rather than animal, and adaptable to many works that are necessary on even a small property where food crops are produced. No claim is made for it being useful on large farms, although it no doubt could be utilized to excellent advantage.

As will be noted from the accompanying illustrations the Beeman garden tractor

worked with an implement, there being two wide rimmed wheels 25 inches diameter, between which the power plant is mounted. The engine is a vertical, single-cylinder, four-cycle, L head type, having 3½-inch bore and 4½-inch stroke that is guaranteed to develop 1½ horsepower at the drawbar and four horsepower for belt work. The engine speed can be varied from 230 to 2000 revolutions a minute, and the tractor speed may be from three-quarters mile to four miles an hour. The engine is cooled by a thermo-siphon circulation of water through a Shotwell honeycomb radiator and a fan, and is lubricated by splash. The source of ignition current is a Heinze high-tension magneto, and the carburetor is a Kingston automatic float feed type. The clutch is a very simple construction, there being an idler transmission gear with an external or internal friction clutch disc. The final drive is by bull pinions meshing with bull gears on the wheels. The clutch is operated by a latch on the left handle and the speed and power of the tractor is controlled by the throttle on the right handle.

The tractor is 17¼ inches wide, 36 inches height and weighs about 500 pounds. The tractor control is located on a frame consisting of two long tubes extending upward diagonally from the main frame, with a crossbar on which are the latch and the throttle. This frame is



Beeman Garden Tractor with Small Wheels Attached, Coupled to a Large Churn.

threshing. Experience demonstrated that while these economized time and men while operated, they were costly investments and could be used but a comparatively small part of the year. With the knowledge gained from actual service tractors as a whole have been greatly reduced in size and weight. There are machines designed for use of great farms that will draw gangs of 28 plows and make a series of furrows 20 feet wide at a single draft, that will plow at the rate of four miles an hour and 80 acres in a 10-hour day; that will draw teams of implements and do work with extreme rapidity. But these cannot be used on small farms.

Those who have studied the requirements of farmers carefully have recommended small machines from the fact that the majority of farms are not large enough to justify the owners investing in extremely expensive machinery. What is wanted is practical economy, which is best obtained with tractors that can be utilized for the greatest diversity of work. There are those who believe that the smaller the tractor the greater will be its utility, and the more it will be demanded by those who want the largest measure of economy. Because of the wide range of requirements and the construction of units to meet these the farm tractor industry is large, sound and well balanced so far as supplying the needs of the country are concerned. There are big tractors for big farms, many types of medium size for smaller farms, and most of them reliable, dependable machines.

But the Beeman garden tractor is a type produced exclusively by the Beeman Garden Tractor Co., Minneapolis, Minn., designed to economize manual labor

tor is guided by an operator who walks behind it. The machine draws the implements and because of the design is especially suited for work where crops are grown in rows. This applies to the cultivation of onions, sugar beets, tobacco, corn, turnip, radish, parsley, parsnip, sage, lettuce, cabbage, asparagus, beans,



Beeman Garden Tractor with a Cultivating Implement Attached—It Will Draw a Seven-Inch Plow or Similar Farm Tools.

peas, carrots, potatoes and the like, for it can be driven astride narrow rows and between wider rows, and it is so constructed that it will work in rows of practically any width.

The tractor is a two-wheel type when

adjustable for height, to serve the convenience of the operator. The tractor has 10 inches clearance between the wheels. When an implement is attached a pair of small wheels that serve to keep the machine upright when driven free

are detached. In one of the illustrations the machine is shown with the wheels in place.

The tractor is so constructed that any of the standard makes of hand, wheel or horse tools can be coupled to it, such as plows, harrows, drills, cultivator teeth and similar equipment. The work of changing implements can be quickly and easily done. With this machine one seven-inch plow is recommended. The gasoline consumption is small, claim being made that one gallon will serve for five hours field work and seven hours belt work.

Statement is made that the belt power is sufficient to do any small work, such as might be required in a barn, granary, wood shed, creamery, or where machines may be operated, and that fanning mills, grindstones, emery wheels, washing machines, wood saws, corn graders, pea and bean threshers, milking machines, churns, water pumps or other tools can be driven. The tractor can be taken anywhere by its own power and when not worked on the field it becomes a portable engine that can be adapted practically and economically. It is really a power plant that is always available and can be utilized without shifting for any purpose up to the limit of its power. One belt will suffice for nearly every use.

The Beeman tractor represents the development work of four years, not of unknown or inexperienced inventors or manufacturers, but of men who have worked under the direction of E. R. Beeman, formerly vice president and manager of the Monitor Drill branch of the Moline Plow Co. He was assisted by skilled and experienced tractor men in the experimental work and manufacturing, both in the shops and the field. Statement is made that the tractor as produced for commercial distribution is mechanically correct, the engineering principles have been proven, and the machines are built of high grade material. It has been a demonstrated success in all kinds of soil, and the claims made for it are based upon actual knowledge of possibilities. Beeman garden tractors are now distributed through farm implement and other dealers in all parts of the country.

ADRIAN-TOLEDO RURAL EXPRESS SERVICE BEGUN.

The Chamber of Commerce of Adrian, Mich., has promoted a motor truck rural express service between that city and Toledo, O., which is now operating, making a round trip between the two cities three days of the week, leaving Adrian Mondays, Wednesdays and Fridays at 7:30 and return from Toledo at 1:30 the same day. The expectation is that the service will be operated daily within a comparatively short time.

Announcement is made that farm mortgage loans that exceed \$100,000 in amount must be passed upon by the Capital Issues Committee at Washington, but loans less than the amount stated are left to the jurisdiction of the district committees of the board.

Acrometer Records Tractor Work

CONDITIONS that were never before experienced have resulted from the activities of state and other organizations seeking to stimulate the production of large crops, especially since most of the states and municipalities, and perhaps private individuals, have purchased tractors and undertaken plowing, harrowing, cultivating and other agricultural operations for those who could not work their land to even normal productivity without assistance.

For instance, most of the states have bought tractors and plows and other necessary implements and have made contracts to plow and do other work, the prices charged being the estimated cost an acre, without profit. Owners of tractors have made contracts to do work for farmers practically on the same basis. These prices have varied, but may be

ferred until established facts prove that this is not as reasonable or as equitable as the time basis.

Government Found Need of Record.

In England the government has purchased large numbers of tractors and has made contract to do work on the basis of acres. In that country, even more than in America, the need has been cultivation of land, with regard to area or other condition that might ordinarily be considered, and expense has been secondary. But, nevertheless, there is no reason for disregarding prices charged or paid for work. In many instances fields are small and because of varying conditions, roughness, stones, banks, marsh and bogs and other obstacles, the entire areas could not be worked with the tractors, or, for that matter, with animals.

When the work had been completed



Acrometer Shown Attached Behind the Gang Plow, an English Instrument, Designed to Record the Work Done by Either Tractor Animal Drawn Implements.

said to range from \$3.50 to \$6 an acre for plowing, and from \$1.50 to \$3 an acre for harrowing, with other work on similar basis.

Very rarely is the area of a field known exactly, and even then there is no way of determining the value of work done save by measuring, which requires time and adds to the cost. If farm land were surveyed and plotted so that when a work was completed a few simple measurements would afford all the information for fixing the price, the condition would be exceedingly simplified.

Experience has shown that time required, at a definite price an hour for the work of tractors, the prices based on the actual operating cost plus a reasonable allowance for profit, would be the most equitable, because of the fact that there will be lost time that is not considered in a charge on an acreage basis. But the price an acre has been very generally accepted and this will probably be pre-

the charges were often disputed by owners, who believed that they were overcharged, and there were numerous controversies that were simply the result of the uncertain knowledge of the areas that had been and had not been worked. In England, as in this country, the basis of work has been generally acreage, and the only manner of satisfactory adjustment was to measure the land after plowing, for instance, and this was found to add considerable to the expense. Because the agricultural operations in England are under the direction of a single body the uncertain and unsatisfactory acreage basis quickly received attention, because of its real importance. There was every reason for the farmers being satisfied that they were receiving governmental encouragement and assistance, and the government at the other hand did not want to do work at a distinct loss, for whatever was undertaken was without expectation of profit.

In America, because each state department is operating independently of the other, and the conditions differ materially, there has not been the same degree of dissatisfaction obtaining that was experienced in America. But without exception the officials have found the only satisfactory manner of determining prices for work has been to measure the work done in each field, often measuring each furrow.

Acremeter Developed in England.

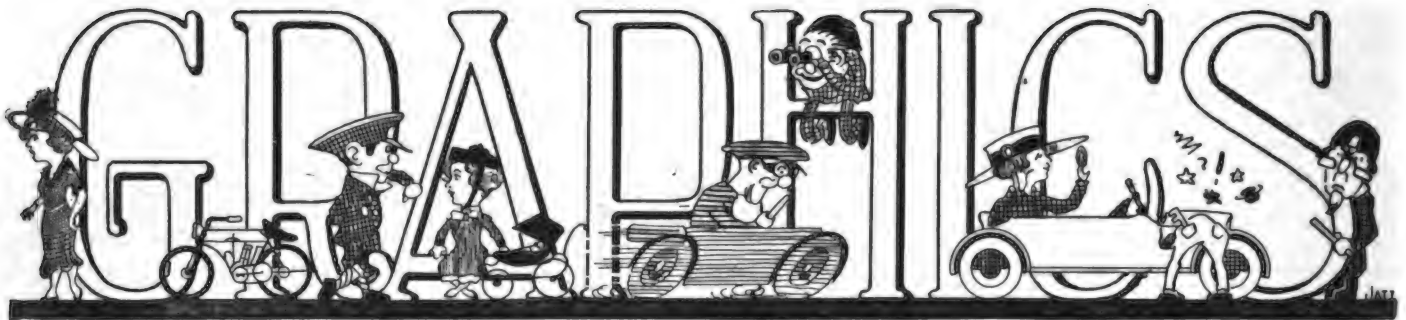
An English inventor has developed and perfected an instrument known as an acremeter, which in general results obtained affords very reasonable data, which can be attached to any implement that is drawn, either by animals or power. It somewhat resembles a speedometer in its manner of indicating, being a train of gears and star wheels operated by a drawn wheel. It is a very practical instrument and has been found by experience to be reasonably accurate. There is no doubt that it saves time and if accepted as a means of officially re-

cording work it is fair to all interested.

The acremeter is fitted with two star wheels for plowing, the one being in use and the other idle, representing two, three, four or six furrows. By removing a nut and taking off the outer star wheel and changing it for the inner, alternation is obtained for multiple furrow registration. The instrument is fitted with two trips, one of which is used to register for two and three furrows and two trips for three and six furrows. The meter is bolted to the plow and is connected to the lifting mechanism on the beam of the plow. When the plow is lifted off the ground the instrument is stopped. The meter, like a speedometer register, is read in tenths of acres, and it can be fitted to corn drills, binders, mowing machines, or, in fact, to any implement that is drawn on the ground, and being connected to the lifting gear it is in every way adjustable. As stated, it will register for a width of six feet by a up to six furrows, either nine or 10 inches wide, and for other implements it

will register for a width of six feet by a simple change that can be made in five minutes' time. As the acremeter only registers when in contact with the ground, it is maintained to be entirely automatic and entirely dependable. It can be fitted to any type of plow.

In use, a reading of the indicating dial is made before work is done, the owner of the land or his representative signing a ticket on which the reading is written. After the work is completed another reading is made and similarly recorded. As the record is in duplicate a copy is given the farmer and the other retained by the tractor driver. From these the price is established and the charge made. Incidentally the acremeter can be used for animal work. The cost of the instrument is said to be moderate and the service life is very long. An accompanying illustration shows the instrument attached to the rear of a plow drawn by a tractor. There is no doubt that such a registering device would be found equally serviceable in this country.



That speeding is not a fault to which the Americans alone are addicted, is shown by an item recently appearing in an English journal, which also would indicate that even the British policeman is prone to err in this matter at times.

"When the deputy chief constable of Taunton was driving from Glastonbury a food production car got in the way," the item states, "and, it was alleged, was driven in a zig-zag course for $4\frac{1}{2}$ miles to prevent the car behind from overtaking it. The defense was that the driver of the obstructing car did not like being passed on a narrow road, and that the speed was 25 miles per hour. Entering the main road he slowed down and the

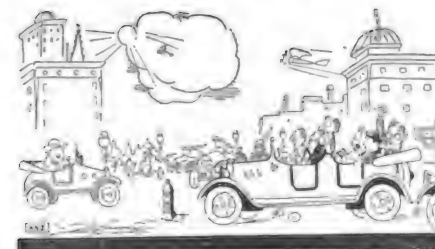
that the British punster is not opposed to recent publication would also indicate



springing chestnuts:

"According to a trade journal there are now very few expensive motor cars for sale, and pedestrians must for the present content themselves with being knocked down by taxicabs and other small fry."

This subtle and brilliant bit of humor appeared in no less publication than the famous humorous journal, Punch, of London. The same idea was incorporated in hundreds of jokes appearing in American papers some 12 or 15 years ago.



The first Sunday after the Fuel Administrator had lifted the ban on Sabbath

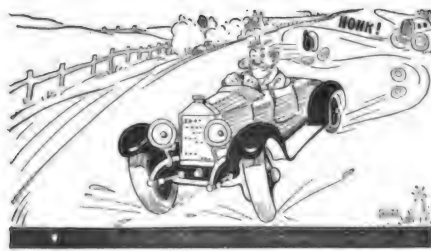
motoring the streets in the large cities were the centers of heavy traffic, giving the impression of a holiday or some gala occasion in contrast with the quiet and inactivity that had been so noticeable during the days on which motoring had been tabooed.

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The gasoline-less Sunday order didn't worry Glenn L. Martin, the aviator and head of the Glenn L. Martin Co. of Cleveland. Mr. Martin, remembering some of the devices used in Europe to save gasoline in the running of motor cars, had the Goodyear Tire and Rubber Co. make up for him a huge gas bag, which he installed on the top of his brougham.



This he filled with regular fuel gas and then ran his machine about the streets of Cleveland and elsewhere quite unconcerned, serene in the knowledge that he was not violating the government's gasoline order and happy in the further belief that he was making a suggestion that might well be followed by car owners generally for the conservation of gasoline.



police car rushed past him like a flash, probably greatly exceeding the former's speed, which landed him in the police court and a fine of \$5 and costs."

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The charge that the English idea of humor is prosaic is well known and it is not difficult to pick from the English journals plenty of samples for substantiation. The following item, however, of

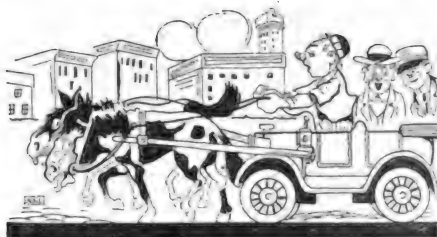
Aside from the work accomplished by the motor car in its normal capacity in the last Liberty Loan drive, it was most effective in helping to make the loan successful as the basis for tank floats, which were used in a number of cities. Various dealers who participated in the drive had replicas of the British tanks made of light material, which were placed over their motor cars and driven about the cities with appropriate slogans and other announcements painted on the sides, created a strong patriotic sentiment. The tanks were not makeshift imitations, but in outward appearance closely resembled the ponderous machines that gave the



Germans the surprise of their lives at the battle of Cambrai.

During the gas-less Sunday period many novel means were employed by motorists to keep their cars going while observing the Fuel Administration's request that no gasoline be used. Many used kerosene, some alcohol, while

others employed illuminating gas. One man in New York, however, resorted to



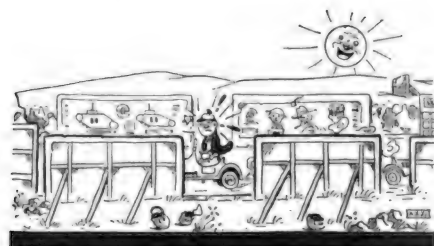
the original horse power, hiring a pair of horses, which he hitched onto the front of the car. This expedient was probably adopted mainly for the purpose of seeking notoriety and it certainly attained this end, as the car was the object of a cheering crowd everywhere it went. One man held the reins while another did the steering and operated the brake.

Motorists of Junction City, Kan., who travel on a long, level road some miles



outside of the town having been testing out their speed recently in competition with a huge jack rabbit, which at times, according to these voracious speedsters, attains a pace of better than 40 miles an hour, or what is known as a "flivver jog" out West. Motorists who have enjoyed the experience of racing with Br'er Rabbit, state that he jumps from the same spot on the road each evening and after racing for several blocks ahead of the machine, jumps back into the brush.

The Pennsylvania Highway Commissioner has recommended a sign board tax



for his state as a means of stopping the rapid eclipse of the scenery as a result of the erection of such a large number of long and high sign boards along the roads leading from Philadelphia to Pittsburgh. It is stated that in some sections the sign boards are so thick that the tourist passes along his way between veritable walls of advertisements.

WAR TAX DECISIONS ON POWER VEHICLES.

The following statements are the official construction of the war taxes as applied to power vehicles and equipment, as established by Deputy Commissioner B. C. Keith of the Treasury Department, Washington, at the request of the National Automobile Dealers' Association.

That automobile bodies, side cars for motorcycles, speedometers and other attachments and accessories to automobiles and motorcycles, are not taxable when sold separately, but they are when sold as part of an automobile or motorcycle or its equipment, whether standard or not.

That where any person other than a manufacturer of the chassis completes and sells an automobile, the tax must be paid on the complete car, less any tax already paid on the sale of the chassis.

That where a dealer, in order to reimburse himself for the tax paid by him to the manufacturer of a chassis, adds the exact amount of the tax to his invoice as a separate item, stating it to be the war tax, such amount may be excluded in determining the price for which the article is sold. But where the price of an article is increased to cover the war tax, the tax is upon the increased price. Or, if the dealer adds any different amount than the actual tax paid, no matter in what way or with what explanation, the tax must be calculated upon the dealer's total bill.

With regard to the inclusion of freight charges in the price upon which the tax is to be computed, that where the freight charges to a point of delivery are paid

by the dealer, such freight charges, if billed as a separate item to cover freight, need not be included in the amount upon which the tax is to be computed. However, as in the case of reimbursement of tax paid, if the price of the article is increased to cover freight charges, the tax is upon the increased price.

Where a dealer purchases a truck from the manufacturer for \$1000, adds a body costing \$400, and sells the complete car for \$1900, plus \$70 freight charges, plus \$30 war tax, or \$2000 in all, the tax is three per cent. of \$2000, or \$60, less the \$30 already paid to the manufacturer upon the sale of the truck, making \$30 tax. On the other hand, if the \$70 freight charges and the \$30 war tax are billed as separate items, they need not be included in the amount upon which the tax is to be computed. The tax would then be three per cent. of \$1900, or \$57, less \$30 tax already paid on the original truck, making \$27 tax due upon the sale by the dealer of the completed machine.

BOARD OF COMMERCE APPROVES TRUCK TRANSPORT.

The Board of Commerce of Bay City, Mich., has undertaken to promote highway transportation between that city and other cities in a very practical way. There is no doubt that with the substantial promotion afforded the services will be developed substantially. Public services are now operated between Bay City and Saginaw, Flint, Holly, Pontiac, Owosso, Lansing, Battle Creek, Midland, Alma and places between these terminals, and freight is delivered in one day from Bay City to Flint and from Bay City to De-

troit in 24 hours. The saving of time has been a marked advantage to business men.

SELDEN COMPANY ELECTS OFFICERS.

At the annual meeting of the stockholders of the Selden Truck Sales Co., held at the general offices of the company at Rochester, N. Y., the following directors were elected: George C. Gordon, William C. Barry, R. H. Salmons, Hal T. Boulden, W. F. Reynolds, E. B. Osborn, F. J. Kolb, H. G. Strong and C. H. Stearns. The reports submitted showed that the company has had a very prosperous year's business and that it has established representation in all principal commercial centers in this country and abroad.

NOVEL LIFE NET CARRIER FOR FIRE DEPARTMENT TRUCK.

The San Francisco fire department has motorized all hook-and-ladder apparatus and in doing so has equipped the trucks that carry the life nets with a specially constructed box which is upported under the body of the truck.

In this box the life net is carried flat and is so arranged that it can be removed from the carrying box very quickly. The box is fastened directly under the platform on which the firemen stand. The placing of the life net out of the way in this manner gives the truck a neater appearance, and gives more room for the firemen on the platform.

Know the Cost of Doing Business

In This Article Dealers Will Find Some Pertinent and Practical Suggestions Covering Overhead, Mark-Up and How to Gauge a Consistent Profit

By Walter Engard.

There is no subject of more importance to the successful management of any business than that of "knowing the cost of doing business and how to correctly figure the "mark-up." The failure on the part of the business man to know to a certainty what his cost of doing business may be and how to figure his mark-up correctly has driven more dealers into the bankruptcy courts than any other one thing.

These two fundamentals are the basic principles upon which all really successful businesses are built. The dealer may have all the other fundamentals of success—good service, good merchandise, courteous employees, etc.—but if he does not know what his costs of doing business may be or if he erred in his method of figuring profits, his chances for making money are very slim. In this day of advancing costs and decreasing profits it behooves the dealer to know, not merely guess at these fundamentals. Because the mark-up can be figured correctly, it is absolutely necessary to know just what the costs of doing business are so that the per cent. of mark-up will be sufficient to cover and leave a fair margin of profit.

Determining Accurate Costs.

In order to determine accurate costs it is necessary to keep an accurate record of all money spent for expense. To find the cost of doing business in per cent., take the total gross sales for the year and divide them into the total cost of doing business (expense); this gives per cent. of expense. For illustration, say the total gross sales for the year are \$50,000 and total expense is \$9573.50. In order to know just what per cent. of all money received is for expense, divide \$9573.50 by \$50,000. The answer will be 19.14 per cent. The rate so obtained is only as accurate as the figures which produced it. If every item of expense in the \$9573.50 has not been included the per cent. of profit as found will not be accurate. All expenses will come out of the gross profit whether they have been charged in it or not. What the expense book doesn't show the bank balance will.

The cost of doing business, of course, is exactly the same whether all items of expense have been charged in or only part of them. If all items of expense are not included, however, the dealer may be led to believe that he can fix a lower selling price than he can afford. He does not realize that his margin of profit will be immediately absorbed by the extra expense which he has failed to charge to his cost of doing business.

This extra cost may not show on his books, but it is there just the same, and will come out of the profits before the end of the year. For example, say that in figuring the per cent. of doing business failure is made to charge into the expense account items which amounted to \$500, and instead of the expense being \$9573.50, as charged on the expense account, they were \$10,073.50. Because of the failure to charge this extra \$500 costs were computed on the figures shown by the expense account and it

shop, however). From all of his records 10 per cent. of his total sales would cover his cost of doing business, as shown by his expense account, but when the end of the year came, instead of a net profit of 10 per cent., as his books showed he should have, his net profit was only 3.5 per cent., a difference of 6.5 per cent., or more than \$5000. For his sales amounted to close to the \$100,000 mark. The following year he resolved to know just what was the matter. He kept a strict account of all items of expense. He discovered that he had not charged into his cost of doing business his wrapping expense (this item alone amounted to a considerable sum in a year), nor had he charged losses and depreciation to expense, as well as several other items which amounted to considerable money in a year's time.

But this was not the only thing that the keeping of an accurate account of all costs did for this dealer; it helped him to keep a closer tab on expenses. When his cost of doing business was being figured at 10 per cent. he thought they were low and gave them very little thought or study. But when his records showed him that they were 16.5 per cent. he began to give them his serious consideration. He installed a new system of management; he kept his eye on the expense account and today with every item of expense charged in, he is doing business on a cost of less than 10 per cent.

Items Entering Into the Costs.

What items enter into the cost of doing business? A list of items that enter into the cost of doing business and that should be charged to expense, follows:

1. Interest on the net amount of total investment; that is, money invested in the stock and fixtures.
2. Rental on all real estate or buildings owned by proprietor and used in his business at an equal rate to that which would be received if rented or leased to others. If quarters are rented charge all rentals to expense.
3. Salaries. This expense will include all salaries paid to employees, also a salary for proprietor equal to that which he would command if in the employ of another and holding the same position. All members of the proprietor's family who may be employed in his business should also be treated in a like manner.
4. Depreciation on all goods which are carried over and upon which a mark-down has to be made because of change in style, damage or for any other reason.

Building Profits

If you sell supplies there are overhead costs.

If you do repairing there are overhead costs.

If you store and care for cars there are overhead costs.

If you do vulcanizing there are overhead costs.

If you do welding there are overhead costs.

If you rent cars there are overhead costs.

If you rent trucks there are overhead costs.

If you sell cars there are overhead costs.

Whatever you do there is some cost attached to it. To make money you must know that cost and to operate at a profit you must know what percentage of profit you can add to your costs to make a consistent revenue.

You can base your actual operating costs on the past year's business and add to that cost what you really know it will cost to operate the coming year and allow an increase that you know you will have to meet.

proved to be 19.14 per cent. For example, say that a net profit of 5.4 per cent. is desired and the goods are marked for a gross profit of 25 per cent. The gross profit on \$50,000 business would be \$12,500, deducting the expense of doing business there should be a net profit of \$2926.50. But instead of a net profit of \$2926.50 there is only \$2426.50, a difference of \$500, or only a net profit of 4.8 per cent. This is a very simple example.

In the case of one retail dealer who figured a gross profit of 20 per cent. and his cost of doing business at 10 per cent. (he was not in the business of selling supplies or running a garage or repair

This will also include concessions in price to patrons given special quotations on a large purchase. The depreciation here will be the difference between the regular retail price and the amount received.

5. Depreciation on fixtures, tools, delivery equipment or anything else suffering from age or wear and tear.

6. Donations and subscriptions given to church, lodges, etc.

7. All fixed expenses such as taxes, insurance, water, light, fuel, etc.

8. Incidental expenses, such as drayage, postage, office supplies, livery or expenses of horse and wagon, telephones, telegrams, advertising, canvassing, etc.

9. Collection expense.

10. Losses, goods stolen, bad accounts, etc.

The above list covers most every item in the operation of an average business, but in order to keep an accurate account

such items as boxes, paper, twine, sacks, labels, etc. Under the "miscellaneous" expense all items included in the other divisions, such as soap for cleaning windows, toilet paper, etc., will be recorded. This expense will include hundreds of small items which usually are overlooked in figuring costs.

Here is included every expense itemized and it can be seen at a glance just how the expenses are running. The dealer will also have a better control over his expenses. At a moment's notice the advertising expense can be totaled and whether it is too large or whether more can be spent can be determined. By this system the dealer will know just where he stands; just where he should economize and where he should make investigations to stop losses.

With the exact cost of doing business the dealer is in a position to correctly figure his mark-up, providing he uses the right method. It is unfortunate, but nevertheless true, that there are a great many dealers doing business today on very little or no profit. Some are doing a large volume of business, yet at the end of the year, after long hours and strenuous work, they make the unhappy discovery that they have accomplished very little in the way of profits. They have nothing to show for their work and worry. This condition is due very largely to their failure to correctly figure the mark-up. It is fundamentally important that every dealer should know exactly how to mark up his goods in order to obtain a profit. Moreover, he should know why the method he uses is right. If he uses a mark-up formula he should know why that formula works.

Methods of Figuring "Mark-Up."

There are two methods of figuring mark-up. The first bases the percentage on the sales; the second bases it upon the cost. Either method is correct. But disaster comes when the dealer mixes the two and fails to realize what he is doing. The first method, based on the total sales, is the simplest, the most satisfactory and by far the easiest and most accurate. In this the selling price equals 100 per cent., or 100 parts. Of this total the cost of the merchandise equals so many parts, the cost of doing business so many parts and the net profit is represented by the number of parts remaining. The sum of all the parts equal 100, no matter how they may be divided.

To illustrate, take an article that costs \$4.50 and find the selling price. Say the cost of doing business is 15 per cent. and a net profit of 10 per cent. is desired. One hundred per cent. or 100 parts equals the selling price; 100 per cent. minus 15 per cent., the cost of doing business, and 10 per cent., the net profit, is 75 per cent., which equals the cost. Therefore, 75 per cent. equals \$4.50.

75 per cent. equals \$4.50.

1 per cent. equals 1/75 of \$4.50, which is six cents.

100 per cent. equals 100 times six cents, which is \$6, the selling price.

Of the selling price (\$6) 15 per cent. goes for the cost of doing business, which is 90 cents; 10 per cent. is net profit, or

60 cents. The remainder, \$4.50, represents cost of merchandise.

Simplicity of Method Shown.

This is a very simple method. It is perfectly clear that if the number of parts in any of three divisions be changed the change will affect one or both of the other parts, since the total must always equal 100 parts. Suppose for example, that the cost of the article is 85 per cent. instead of 75 per cent. If the cost of doing business remains the same, nothing is left for net profit. Again suppose the cost of the article remains as originally at 75 per cent., but the cost of doing business is reduced to 10 per cent., then the net profit increases to 15 per cent. A change in any one of the parts, in other words, is bound to affect one or both of the other parts.

The second method of figuring mark-up is based on the cost. In this, 10 per cent. or 100 parts represents the cost, instead of the sell-

Must Know Costs

If you know what it cost to do business you can then build your business to the profit making point. You never can until you know. If you do show a profit without such knowledge it is all luck and when the pinch comes you will be all at sea. Furthermore, if you do know and are making a profit you can add to it.

Stop the leaks, such losses are the easiest profit earned. Do not make one department earn the dividends and carry the others. Get your overhead costs in all departments. If you are losing in any one department learn the operating costs before increasing the prices for either goods or labor. It may be in the waste through lack of common sense system.

If you do work or sell goods at a loss let the other chap have the business. It may be in his particular line and in it he can make a profit. Take on the work that will show a profit or sell the lines that you can place and show a gain. This will not hurt your business or help the other chap. If you make money you can give the service and if you do you will secure the patronage and profit.

of all expenses an expense book should be kept. This book should be subdivided into 12 separate divisions. These headings should be: Rent, salaries, advertising, drayage, delivery, heat and light, supplies, insurance and taxes, wrapping expense, depreciation and shrinkage, bad debts and miscellaneous expense.

Under each heading will be charged every item of expense pertaining to that department, as for instance all forms of publicity will be entered under the heading "advertising," including donations and subscriptions, bill boards, newspaper space, dodgers, etc. Under the heading of "wrapping expense" will be entered

Adopt A System

Keep working yourself these times and build up every branch of your business so that it will be turning in a profit. If you cannot make money in one way the door is wide open; take on other lines that will sell and show a net gain. There is money spent and as long as there are 5,400,000 passenger cars and 300,000 trucks in use there must be business for you.

If your accounting methods are not comprehensive, correct this weakness in your business. You can swing a simple system; any good bookkeeper can fix you out and start you off with one that will just fit in with your requirements. You can do the rest. Don't guess any longer. Start to know at once. Facts may vary, but figures seldom do and until you have the records you can never get your figures.

This article is a whole business lesson in itself. If you do not believe it just ask yourself a few questions and then see how you fit in with your own business. If you know the facts, discuss it, it will refresh your memory and make you even more particular about overhead costs and profits.

ing price, as in method No. 1. The cost of merchandise will always be 100 parts, but the cost of doing business and net profit may be any figure. In using this method of figuring mark-up the cost of doing business must be based on the cost of merchandise; also the net profit. Probably more errors are made at this point than anywhere else. The error usually comes from the fact that as a rule the average merchant figures his cost of doing business and the net profit as a percentage of sales. Then when figuring mark-up they take their cost of doing business per cent. as based on

sales, add to it the per cent. of net profit as based on sales and completely forget that these figures are not based on the cost of merchandise as they should be. Therefore, the mark-up percentage is too small, for the sum figured as a percentage of the total sales always is smaller than the same sum figured as a percentage of the total cost of merchandise.

To prove this, suppose the sales for a certain store are \$50,000. The cost of doing business is \$9,500 and the cost of merchandise is \$38,000. The remainder, \$2,500, is the net profit. The cost of doing business, figured as a percentage of sales, will be as follows:

\$50,000	\$9,500.00	.19 (19 per cent.)
	5,000.00	
	4,500.00	
	4,500.00	

The net profit figured on the sales will be:

\$50,000	\$2,500.00	.05 (5 per cent.)
	2,500.00	

Now basing the same figures on the cost of the merchandise, we find they are as follows:

\$38,000	\$9,500.00	.25 (25 per cent.)
	7,600.00	

The net profit:

\$38,000	\$2,500.00	.066 (6.6 per cent.)
	2,280.00	
	220.00	
	228.00	

Here we find a difference of six per cent. between the cost of doing business figured as a percentage on the sales and as a percentage of the cost of merchandise; and in the net profit there is a difference of 1.6 per cent. Suppose a dealer takes the wrong figures as the basis of his mark-up. Say an article costing \$4, and in the effort to find his retail price he uses the percentage as based on the sales. He would figure:

19 per cent. plus 5 per cent. is 24 per cent. (the cost of doing business plus the net profit as based on the sales.)

\$4 times 24 per cent. is .96 cents (gross profit).

\$4 plus 96 cents is \$4.96 (his selling price).

Would a profit be made at this figure? By using the correct figures the result would be:

\$4 times 25 per cent. (his real cost of doing business) is \$1.

\$4 plus \$1 equals \$5 (a selling price, figured on a correct cost of doing business, but without taking any net profit.)

It will be plainly seen that the dealer who erroneously marked his goods to sell at \$4.96 would be paying four cents for the privilege of handing them over the counter to his customers. But if this dealer figures his mark-up so it will bring him a profit he will proceed as follows:

25 per cent. plus 6.6 per cent. equals 31.6 per cent. (gross profit).

\$4 times 31.6 per cent. equals \$1.26.

\$4 plus \$1.26 is \$5.26 (his correct selling price).

The above illustration will show how easily it is to become confused in figuring mark-up when in reality money is being lost. So it is tremendously important that a dealer know exactly what he is doing. If he counts on too small a mark-up he will only be cheating himself and paving an easy road for loss. And if this trouble persists in all mark-ups, all opportunity to make money is lost. On the other hand, if he unwittingly figures too large a mark-up, he runs the risk of selling at a higher figure than his competitors and loses trade by so doing.

BOARD OF COMMERCE APPROVES TRUCK DEPARTMENT.

The Board of Commerce of Bay City, Mich., has undertaken to promote highway transportation between that city and other cities in a very practical way. There is no doubt that with the substantial promotion afforded the services will be developed substantially. Public services are now operated between Bay City and Saginaw, Flint, Holly, Pontiac, Owosso, Lansing, Battle Creek, Midland, Alma and places between these terminals, and freight is delivered in one day from Bay City to Flint and from Bay City to Detroit in 24 hours. The saving of time has been a marked advantage to business men.

GENERAL MOTORS CORPORATION SHOWS LARGE PROFITS.

For the six months ending June 30 the profits of the General Motors Corporation totaled \$26,978,120, and after paying the Federal taxes and all extraordinary expenses a balance remained of \$12,587,259. Following the payment of preferred dividends \$11,717,480 remained, or approximately \$11.14 a share on common stock outstanding to the value of \$105,141,700.

CONTINENTAL MOTORS HAS YEAR'S ORDERS.

The Continental Motors Corporation, Detroit, has just paid to holders of common stock a dividend of 1½ per cent., this making a total of six per cent. paid on common stock during the calendar year. Secretary W. R. Angell, advising the stockholders of the dividend, stated that the business of the company was very satisfactory, and that the orders ahead insured the operation of the Detroit and Muskegon plants until late in the autumn of next year.

During the eight months ending Aug. 31 the sales of the United States Rubber Co. were greater by 34 per cent. than they were for the corresponding period of 1917. The working capital of the company is now in excess of \$95,000,000, with cash assets exceeding the floating debt about \$1,500,000.

FORDSON TRACTOR PULLEY ATTACHMENT.

The Fordson tractors thus far built have no belt pulley and for that reason cannot be utilized for belt work, which is regarded by many buyers almost as necessary as hauling field implements. Although 24,000 machines have thus far been built, none have this utility. Henry Ford & Son will during November produce an attachment that may be fitted to Fordson tractors, so that they may be used to supply belt power. It is built without a governor. Statement is made that owners of tractors were so insistent for such equipment that they could use their machines for power plants that the company was impelled to produce what has been developed. The tractor is claimed to afford good results with the attachment and that a governor is unnecessary. The attachment will be furnished at additional cost to all Fordson owners. All tractors delivered after the attachment is produced commercially will have it fitted as extra equipment.

FENNER BECOMES ASSISTANT TO C. C. HANCH.

David C. Fenner, with the International Motor Co., member of the Highways Transport Committee of the New York State Council of Defense, member of the motor truck committee of the National Automobile Chamber of Commerce, president of the Motor Truck Association of America, is now located in Washington as assistant to C. C. Hanch, chief of the Automotive Products Section of the War Industries Board.

LAND MANAGER.

R. J. Miller, formerly connected with the Studebaker Corporation, has been appointed district sales manager for New England for the Cleveland Tractor Co. to succeed H. S. Ketcham, who recently resigned that position. Mr. Miller's headquarters is in Boston with A. H. Sowers, who is agent for Eastern Massachusetts for Cleveland tractors.

MITCHELL & SMITH CO. CARRY BIG LINE OF GASKETS.

The Mitchell & Smith Co., Inc., 1090-92 Commonwealth Ave., Boston, Mass., are carrying a large stock of gaskets for every make of car and can fill all orders without any delay.

The Zenith Carburetor Co., Detroit, has obtained authorization for an addition to its factory that will cost approximately \$75,000. Work is to be begun immediately.

To harden files dip in red hot lead, handles up, which gives a uniform heat without warping. Run the file back and forth in a pan of salt water, then set it in a vise and straighten while still warm.

To "soften" files cover with oil and hold over a fire until the oil blazes. When the flame runs all over the file plunge into water.

dition the timer was examined, and when this was removed it was found to be so much worn that further use appeared problematical.

The segments were worn considerable below the surface of the insulation, and the roller brush would pass the segments without making firm contact. The segments were carefully removed and then a sheet of a letter was cut into strips for shims and the thicknesses were placed behind each contact piece. With these in place when the segments were screwed up the edges, while somewhat uneven, were flush with the fiber insulation.

In testing the repair the small coil spring which held the roller arm and causes the brush to make firm contact was lost. After unsuccessful search was made for it the need of a substitute was obvious, and this was made from a "safety pin," the point and the fastener being cut off and the ends bent to hook into the brush arm and the fixed bracket. With the paper shims and the "safety" pin spring holding the brush the timer was assembled and during the remainder of the journey it proved to be satisfactory from every point of view.

CARE OF THE MAGNETO.

Magnetos have been developed to such a degree that the chief requirement to maintain them in good condition is the application of a few drops of oil occasionally. But they must be kept dry and clean, as oil and dust that will accumulate in the distributor will eventually set up resistance to the passing of current and short circuiting will result. This will greatly impair the efficiency of the machine.

Few of the auxiliaries used with power vehicle engines are comparable with magnetos for durability and reliability considering the attention given them. All the oil needed is one drop of very light lubricant every 500 miles in each oil hole. There are usually but three places where oil can be applied, one at each end of the armature shaft and one at the distributor. A leather boot is the best means to protect a magneto against dust and moisture. A rare occurrence is water from rain getting into the safety gap, which will stop the delivery of current. There are many types of magneto fitted with water proof coverings, but these do not always fully protect the machines against moisture.

One detail is to keep the magneto clean. This requires that the distributor head shall be removed regularly and cleaned with a cloth dipped in gasoline. The dirt and oil that will in time accumulate mean a short circuit if not removed. The cover should then be removed and the inside cleaned in the same way. While the distributor is open one has opportunity to inspect the fit and general condition of the carbon brush assembly. Black accumulations, due to wear of the carbon brushes, can be removed with a gasoline saturated cloth. See that the brushes are in good condition, that they make good contact, and should any of them stick in the holders, due to accumulated grease and dirt, a few drops of

gasoline will be sufficient to clear them.

Another place needing careful inspection is the points of the circuit breaker, which will become pitted from the arcing of the current as the circuit is made and broken. There is a tendency for the current to carry minute particles from the positive to the negative point. Accumulation of dust on the points may also affect them to some extent. Sometimes the pitting of the points will be so deep and the surfaces so rough and irregular that the current will not pass. The remedy is to smooth them with a very thin, flat file or a piece of No. 00 sandpaper. The sand paper may be folded so that there will be two sanded surfaces, and when this is drawn between the points both may be cleaned at the one operation. The points may be separated by unscrewing the large platinum pointed screws or by advancing the spark lever until they close on the sandpaper, which may be moved backward and forward between them. Care should be taken to remove no more platinum than is necessary to obtain smooth surface, and both should be even and true. Sometimes merely drawing a piece of paper between them will remove the oil and dust that has obstructed the current and will restore them to efficiency. Files are made for this work, but in the hands of unskilled workers there is a possibility of more damage than good being done, and very satisfactory restoration can be made with the sandpaper and there is less probability of removing the platinum, which is very soft and easily cut away.

When this work has been done the engine should be cranked until the points are wide open. By inserting the gauge usually provided by magneto manufacturers with all machines sold, and which are part of the regular equipment received by the owner, the gap can be measured. This gauge should pass through with slight friction. A gap of .015 inch is about the correct spacing for the points, and the adjustment can be made with the wrench provided with the magneto for this work.

Another element that requires attention after long service is the collector ring. One probability is gumming, which will cause the ring to make close contact with the carbon brush that rides in the collector ring groove, and when this condition obtains the current cannot pass. To determine the condition of the ring remove the brush and with a small electric light examine the groove. If it is in good condition the ring will be bright, but wherever it is not bright that deposit should be removed by dipping a small piece of cloth in gasoline and placing it on the end of a small, round stick, which can be inserted vertically in the groove. With the engine cranked by a helper the ring may be revolved and the groove thoroughly freed of any foreign matter. While the carbon brush is out of the ring it should be examined for cracks, and one had best see that it moves freely in its guide or holder and that there is good tension on the coiled spring.

No one should undertake to make repairs to the magneto other than an expert with a complete kit of tools, and it

should be shipped to the manufacturer for such repairs as for a leaky condenser, loose windings, ruptured secondary or weak magnets. Many an instance of sluggish engine action can be traced directly to a weak spark due to some electrical or mechanical derangement in the magneto itself, and for this reason, once a year at least, and better still, every six months if used for heavy truck service, the magneto should be given a complete overhaul. Present day fuel contains a very high percentage of kerosene, the engine requires the hottest spark possible to ignite the charge, cause good combustion and obtain good efficiency. Unless the ignition system is functioning normally there will be excessive consumption of fuel, lack of power and increased operating cost, as well as a lack of flexibility so essential to power vehicle.

CARE OF ENGINE COOLING SYSTEMS.

Many instances of the reduced efficiency of gasoline engines can be traced directly to the failure of the cooling systems to keep the temperature of the radiating medium down to the degree that will insure safe operation. The man who anticipates trouble is a greater man than one who simply "doctors" after something has happened. Many high grade trucks and passenger cars are frequently damaged by the water level falling too low in the radiators, either from oversight, or leakage in the cells, or the piping, or perhaps from evaporation.

When water is low in the upper tank, especially in thermo-syphon systems, the engine cannot possibly be cooled adequately. Complete radiation is not possible from the cooling area, even though the water is pump circulated. The thermo-syphon requires a steady stream of water from the radiator inlet to the radiator outlet and back to the cylinder jacket and back to the radiator intake, and if the stream is not continuous the engine cannot be effectually cooled.

One of the peculiarities of the thermo-syphon system is that when the water level is too low steam pockets are formed, which retard the circulation and overheating results, lessening the volume of the oil films between the pistons and the cylinder walls, or even destroying them, which is followed by rapid wear of the moving parts, and possibly by seizing of the pistons. Piston seizing is a result that may happen with any system of cooling that has not a full degree of efficiency.

If leaks have been developed in the radiator these should be stopped. Some of the radiator mending compounds which are placed in the water and by chemical action or other means seal small leaks, possess considerable merits for temporary repair. But if one desires a permanent repair this can only be done by soldering, which is a work that must be done by a skilled worker.

The engine builder, after long study and at considerable expense, has provided a cooling system for no other reason than to maintain an oil film between the pistons and the cylinder walls, this insuring that the pistons will move freely and

with the least loss of power through friction. Of course it is possible to destroy this oil film though the water system be completely filled, by running the engine for a long time with the spark retarded, or if the cylinder heads be heavily carbonized, but so long as the oil film remains there can be no damage, even if the water is boiling or nearly so.

An engine will become greatly heated with a retarded spark. The reason for this is plain when we consider that the piston has already started on the downward stroke after reaching its highest compression, and the explosion takes place a very small fraction of a second after the spark has been made in the cylinder.

When advanced the spark occurs on the upward stroke, while when retarded the spark takes place after the piston has begun the downward stroke and greater heat is produced. That overheating results is not surprising when one realizes that the highest temperature as the charge is burned in the cylinder, following the making of the spark, will range from 2500 to 3000 degrees Fahrenheit.

Two methods of cooling are used for the engines of power vehicles—air and water. By the first methods the cylinders are fitted with pins, ribs or flanges that increase the radiating surfaces, and over these there is usually a current of air driven at high velocity, the temperature being kept within safe operating limits.

By the second method the cylinders are cooled by being surrounded by baths of water, which is circulated through a radiator, through the cells of which air is driven or drawn, the radiator having a cooling area that is scientifically determined to diffuse a given number of heat units.

In both systems it is of paramount importance that the belt driving the fan be kept at a tension that will insure full efficiency, and slippage should be insured against by frequent examinations and treatments with French chalk, as well as by adjustments of the tension. In the water cooled systems the pump may become clogged after long service with rust or sediment, particularly if hard water is used. Hard water contains lime and other impurities that cause deposits and scale, which insulate the walls and prevent the diffusion of heat. Whenever possible the cooling systems should be filled with rain water that has been strained. This is the safest way of preventing deposits and scale.

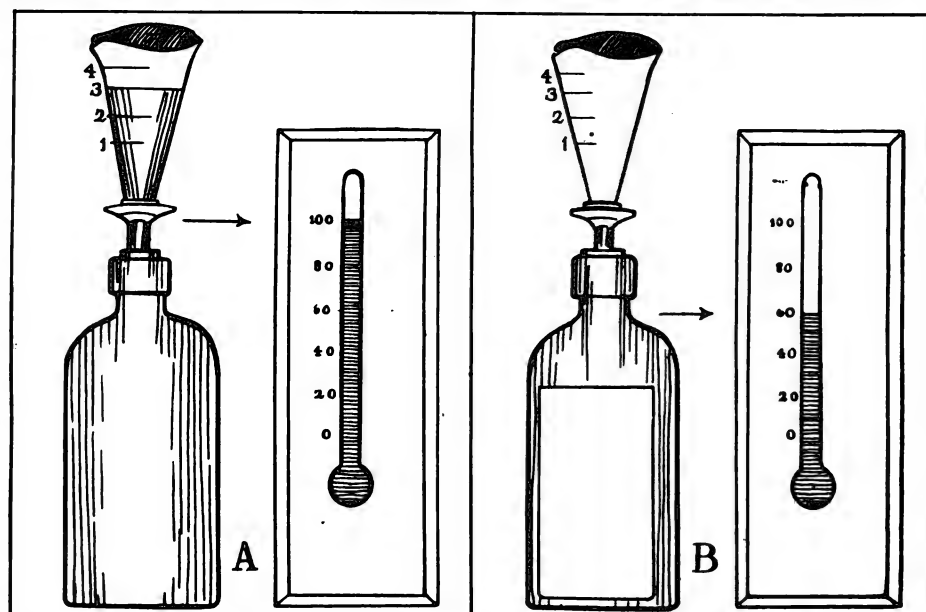
The next important unit is the radiator, which frequently becomes more or less clogged with rust, or sediment, or deposits, which means retardation of the water circulation. The condition of the radiator should receive as much attention and care as any other part of the vehicle. It should be cleaned regularly so that there is certainty that it will function to full efficiency. If this care is given it will go a long way toward obviating pump trouble. If the cooling system has been neglected for a long period the best means to clean it is to remove the water header or the detachable head, and with a scraper or heavy wire loosen the scale and flush out the cooling section.

In ordinary conditions three remedies are practical. The one that is often recommended is putting a quarter of a pint of glycerine into the radiator and let it remain there for a week or two, running the engine frequently on the road. Then the mixture of water and glycerine may be drained from the system and the radiator flushed thoroughly and refilled with pure water.

Another method, and this is most commonly employed, is to dissolve two large handfuls of washing soda in a pail of boiling water. This should be stirred thoroughly with a flat stick. The solution should then be strained and after the radiator drainage cock has been closed it should be poured into the filler cap. The engine should then be run for 10 minutes with the throttle a quarter open. The ignition switch is then opened and the engine allowed to stand for 10 minutes. The engine is next run for 10 minutes as before, after which the solu-

year, at least, it may be necessary to re-pack the glands or stuffing boxes at each end of the pump shaft. Again, merely tightening the gland nuts will stop leakage, but care should be taken not to tighten these more than is absolutely necessary, as the leakage will not be due to loosening of the gland itself, but to worn packing. One had best renew the packing than attempt to stop the leak by tightening the gland nut too much. The packing is usually made of candle wicking soaked in melted tallow, or heavy cotton twine similarly treated, or special packing may be obtained at a service station. After the nut has been turned to press the packing there is no reason to turn it more, for doing so might damage the water pump.

With the approach of cold weather the cooling system of any car or truck should be examined and whatever repairs necessary made. An engine may be 85 per cent. efficient, but this value is lost if



Variance in Gasoline Volume from Temperature: A, 128 Fluid Ounces (One Gallon) at 100 Degrees Will Fill Bottle, Tube and Graduate to the Level Shown; B, but Same Volume, Cooled to 60 Degrees Fahrenheit, Will Measure 124 4/5 Ounces, Filling the Bottle to the Top, a Shrinkage of 3 1/5 Ounces, or About 2 1/2 % in Volume.

tion is drained from the radiator. The system should then be flushed and refilled with pure water.

An engine cooled with a thermo-syphon system should be warm when it is to be cleaned with this solution, so that circulation shall be begun immediately after the engine shall be started. The soda solution is very effective in loosening scale. After the solution has been drained the radiator and water jacket should be filled with a hose introduced into the filler cap. The engine should then be run for a short time and drained again to remove all of the soda, though no damage would be done were it not entirely removed, though it might possibly cause deterioration of the rubber hose and connections.

In rare case the pump of a force water circulation will fail, due to the stripping of a gear or the shearing of a key on the pump shaft. At intervals the pump shaft and the pump should be examined to determine their condition. Once a

the cooling system is neglected in any way.

VARIATION IN VOLUME OF GASOLINE AT DIFFERENT TEMPERATURES.

The companies distributing gasoline to consumers transport this fuel in dark colored tank cars and tank wagons and store it in elevated tanks that are exposed to the sunlight and heat, and the retailers as a rule store gasoline in underground tanks, buried from five to 10 feet deep in cool soil. This being the case, one can understand that the retailer buys heated "gas" and sells it at considerably lower temperature during a part of the year at least, this resulting in a loss through contraction of the fuel.

An experiment was recently made to determine what would be the loss if a change of 40 degrees temperature should be made in a volume of gasoline. The result obtained showed a shrinkage of approximately 3 1/5 ounces (fluid) in a gal-

lon, or expressed in terms of money, two-thirds cent a gallon at a price of 25 cents a gallon. This may appear to be a very small fraction, but in the aggregate it represents a considerable amount. One will understand that the shrinkage of fuel delivered from tank wagons at 85 degrees temperature and later sold at 55 degrees, if bought at 22 cents and sold for 25 cents, reduce the profit of the dealer from three to 2½ cents a gallon.

As an illustration, take a summer's day when the temperature is 72 in the shade, the temperature of a volume of five gallons, exposed to the sun two hours, increased to 140 degrees, while that just pumped from an underground tank was 65 degrees Fahrenheit. With these conditions noted one can see that during the summer months with high temperatures, there will be considerable loss from contraction of volume. The cooler the weather when the purchase is made the greater the loss. The private owner of an underground tank can gain slightly by buying as much as possible when the fuel delivered by the tank wagon will be cool and will require the least space. One can note the difference in volume of gasoline due to expansion and contraction by the accompanying sketch of bottles and thermometers.

HINTS AND TIPS.

Tire Conservation.

The constant chafing of tire tubes against the inner walls of shoes is the cause of a considerable part of the trouble that is realized by owners, even with the highest priced standard makes of tires. If the friction and the heat caused by tube and shoe chafing can be minimized there would be greater wear and considerably decreased expense, to say nothing of the greater satisfaction that would obtain. Tire manufacturers recommend the use of pulverized mica, soapstone, talc and similar powders, that, sprinkled in the shoes, serve as lubricants and keep the surface in contact from wearing and heating. Better than any of these, however, is a special form of flake graphite, which has been recently placed in the market, which will form a smooth coat or veneer on both surfaces and reduce the friction to the lowest practical degree. The more the graphite is rubbed the greater the degree of polish, and there can be no adherence between the tube or shoe.

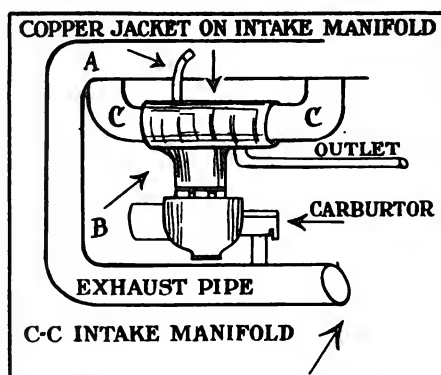
Heating the Carburetor.

A considerable percentage of the cars built in 1912 are still in use. Unless these are equipped with devices for pre-heating the fuel there is considerable difficulty in obtaining satisfactory operation. The average gasoline obtainable is heavy and slow to vaporize and good carburetion is not practical unless there are some means for heating the fuel as it is introduced into the engine cylinders. Five or six years ago there was comparatively little attention given to fuel vaporization aside from what was obtainable in the average carburetor. This change of opinion is not due to engine design, but to the difference in fuel, and most of the cars built today are equipped with heated

carburetors, heated manifolds, heated air ducts and numerous other means for increasing the temperature of the fuel as it is admitted to the engine cylinders.

There is no discounting the value of these devices, but there are those who do not change the equipment of their cars because they are apprehensive as to the expense. The simplest form of heating the fuel, and it has given extreme satisfaction to those who have utilized it and adapted their engines, is a hot air stove or jacket that may be fitted by the man who has some idea of the use of tools, but no especial mechanical training. Or after laying out the plan on paper one may take the plan to any garage man to do the work.

The stove is made primarily of a piece of sheet copper that is made almost circular in form, being about four inches long, fitting it around the intake manifold as one would fit a ring on a finger. A length of flexible tube, which is obtainable at any automobile supply store, 1½ inches diameter, which will vary in length from eight to 12 inches, according to the manifold design, with suitable connections at either end, admits the hot exhaust gas into the jacket, and being made of copper retains the heat longer. At



Home Made Hot Air Jacket for the Carburetor Manifold of Old Engines to Gasify the Present Day Heavier Fuel.

the opposite end of the tank is placed the outlet, which is a piece of thin metal tube ½ inch diameter. This is about a half inch long and being offset directs the gases away from the carburetor.

Improvised Carbon Brush.

Carbon brushes such as are used in magnetos and other electric apparatus of power vehicles may break or fail to function because of other causes remote from a garage or service station. Comparatively few drivers are thoughtful enough to carry a few brushes in their supplies of spares.

One may temporarily replace a broken or defective brush with one cut with a knife from the carbon electrode of a pocket flashlight cell, or from a carbon electrode of a standard type dry cell, or from the lead of a large sized pencil that is reasonably soft. From these the temporary brush is cut the length and width to fit the holder. If any of these suggested substitutes are not available one may use a metal brush, which may be made from any piece of soft metal or a bit of wire gauze that has been rolled as tightly as is possible.

One of the many important details to

be remembered when scraping-in or re-fitting crankshaft bearings is the alignment, especially of the front bearing, which affects the timing gear. Begin the work on the front bearing, with the others lined with it, care being taken that the front bearing is so fitted that the gear on the forward end of the crankshaft meshes correctly with the other gears of the timing gearset.

Applying Tires.

When putting a tire on a rim that is diagonally split, first determine whether or not the rim is true or out of shape. If misshapen hammering will have to be resorted to after much of the work is done. Also make sure that the rim ends come together before any work is started. If trouble is experienced mount the tire as you would a clincher shoe. However, with some rims there is a tongue, which in turn drops into a slot of similar shape in the rim end. In the event the tongue is broken the rim can be used by causing the ends to butt, by using a jack as a spreader, and then soldering a piece of metal across the split ends to prevent them separating. This will serve if no other ring is at hand.

GENERAL MOTORS ABSORBS THE CHEVROLET.

The stockholders of the General Motors Corporation have voted to absorb the Chevrolet Motor Co., and this was in accordance with the plan by which the holders of Chevrolet stock receive 1 1/7 shares of General Motors common stock and 44 cents for each share.

The balance sheet of the Chevrolet Motor Co., as of Oct. 11, shows assets of \$73,546,042, consisting of \$278,042 cash and 732,680 charges of General Motors common stock valued at \$73,268,000, and liabilities of 641,095 shares of capital stock valued at \$64,109,500, and surplus and undivided profits of \$9,436,542. A dividend of \$3 a share on common stock of the General Motors Corporation was declared, payable Nov. 1, at the Guaranty Trust Co., New York City, and Chevrolet stockholders who do not convert their stock prior to that date will receive a cash equivalent on presentation of the

WILLYS-OVERLAND, INC., TO MOVE EXPORT OFFICES.

Because of the prospect for very greatly increased business following the close of the war the headquarters of the export department of Willys-Overland, Inc., is to be removed shortly to New York City. Export Manager R. T. Williams will locate in the metropolis, where he will be joined by E. C. Morse, who is now representing the Willys-Overland interests at Washington, and who will be connected with the export department.

The creditors of the Regal Motor Car Co., whose claims were secured by first mortgage gold notes, will be paid in full. The unsecured creditors will receive from 20 to 25 per cent. of their claims, according to statement by the Security Trust Co., Detroit, receiver for the company.

Reports of Activities In the Motor Industry

The Air-O-Flex Automobile Corporation, Detroit, Mich., has located its offices at the factory.

The O. J. Beaudette Co., Pontiac, Mich., has been awarded government orders for two types of transport bodies and for a touring car body. For several weeks past the company has not been in full operation, owing to curtailment of passenger car production. The company are manufacturers of metal motor car bodies.

The Mason Tire and Rubber Co., Kent, O., is manufacturing rubberized rain-coats for the army. The company will turn out 1000 coats a day by the first of the year. Additional plant capacity has been leased for the duration of the war.

The Herff Motor Corporation, Memphis, Tenn., has taken over the State Automobile Co. The Herff company distributes the Briscoe and Elgin and has branches at Nashville, Tenn.; Little Rock, Ark., and Birmingham, Ala.

The Northern Foundry Co., Marinette, Wis., manufacturers of automobile castings, will double the capacity of its plant. The company has purchased the business and equipment of the Dost Pattern Works, Menominee, Mich. Bruno E. Dost is proprietor of the concern and he has joined the Northern company as pattern works manager. The company specializes in tractor and gas engine castings.

The Anderson Forge and Machine Co.,

The Cincinnati Auto Specialty Co., Cincinnati, O., has moved into new quarters, where it will have 20,000 square feet of manufacturing space.

A. R. Mosler & Co., New York City, has made a number of changes in its selling force and is now represented by the following men: F. G. Wright, New England; L. G. Falck, New York and Pennsylvania; J. E. Patton, Eastern Pennsylvania, Maryland, Delaware and Virginia; I. W. Becker, South Atlantic coast states; H. H. Meyer, Ohio and Michigan; F. S. Murray, Indiana, Kentucky and Southern Illinois; John Staff, Southwest; C. D. Parr, Nebraska, Kansas and Missouri; E. Gluckauf, Illinois and Northwest; M. L. Monger, Inter-Mountain; I. H. Sollish, New York City and New Jersey.

The Falls Motors Corporation, Sheboygan Falls, Wis., will erect a large addition to the plant. It will consist of a one-story shop addition, 120 by 275 feet, and it is the fourth important extension made within a year's time. The company is devoting most of its time to the manufacture of engines for government trucks and other army purposes.

The Steel Products Co., Detroit, Mich., is building a one-story machine shop 89 by 123 feet, to cost \$30,000.

The Bucyrus Tire and Rubber Co., New York City, has leased the plant formerly operated by the Bucyrus Rubber Co. The company will manufacture tires, tubes and other rubber articles. The president and general manager is C. O. Henderson; vice president, Joseph Friedman, and secretary and treasurer, George C. Riley.

The Kissel Motor Car Co., Hartford, Wis., will erect a one-story warehouse building, 50 by 260 feet. The company is devoting practically its entire facilities to the production of F. W. D. trucks for the government.

The Detroit Lubricator Co. will erect a one-story shipping room, 104 by 120 feet. It will cost \$25,000.

The United States Gear Shift Co., Eau Claire, Wis., has completed its new manufacturing plant. It is four stories high, 80 by 100 feet, and is equipped to manufacture the Laursen hydraulic gear shifting device for motor vehicles. The regular line of work will be undertaken as soon as the war requirements have been filled.

The John W. Lauson Manufacturing Co., New Holstein, Wis., has appointed agencies with the Gibbes Machinery Co., Columbia, S. C., for the Carolinas, and W. J. Dabey Implement Co., Atlanta, Ga., distributor of tractors, motor cars and farm implements.

The International Steel Products Co., Milwaukee, Wis., has broken ground for the erection of its new and permanent works in Hartford, Wis. The first unit will cost about \$30,000. The company manufactures gas engine silencers and other accessories and parts of pressed sheet steel.



The Plant of the Williams Foundry and Machine Co., Akron, O., Manufacturer of the Tire Making Machinery and Tools, Which is Claimed to Be the Largest Operator of the Kind in the World.

The Central Machine and Tool Co., Toledo, O., is furnishing war plants with jigs, dies, snap and tolerance gages and special machinery for war work. The company is filling an order for special polishing machinery for a shell plant. Testing machines for shells and dies and reamers for shell cases are made. The president is William F. Ploch and George E. Walters has taken over the management of the company's operations.

The Champion Ignition Co., Flint, Mich., will erect a three-story addition to its plant to cost approximately \$50,000.

The Simmons Manufacturing Co., Cleveland, O., has purchased a four-story building containing 28,000 square feet of floor space. The company manufactures repair parts for light trucks and passenger cars.

The Square Turn Tractor Co. has removed its executive offices from Chicago to its factory in Norfolk, Neb. The company will erect several new buildings.

The Auto Body Co., Lansing, Mich., has received a war order for truck bodies amounting to \$500,000.

Detroit, Mich., has placed contracts for an addition to its office building and die shop on Jefferson and Conners Creek. War work and other activities has made it necessary to expand the plant.

The Schaefer Rubber Co., Cincinnati, O., has increased its capital stock from \$50,000 to \$100,000.

The G. A. Schacht Motor Truck Co., Cincinnati, O., is erecting a one-story factory addition, 75 by 250 feet. The new building will be used for assembling.

The Lone Star Motor Co., El Paso, Tex., has taken the state agency for the Lauson tractor and a stock of tractors and repair parts will be maintained at Dallas and Houston, as well as at El Paso. The Lone Star sells cars such as the Packard, Stutz, Hudson and Dodge Brothers. The president is E. Gordon Perry.

The Supreme Motors Corporation, Cleveland, O., will build a plant at Warren, O. The first unit will be built to meet war requirements. When peace comes the company plans to build a complete line of engines. The officers are: President, A. W. Green; vice president and general manager, C. H. Davies; secretary, C. F. Erickson, and treasurer, C. N. Mitchell.

And Happenings Among the Parts Makers

The Allen-Bradley Co., Milwaukee, Wis., will erect a shop addition, 65 by 100 feet, two stories high. It will cost about \$40,000. The company manufactures electric controlling apparatus.

The Elkhart Carriage and Motor Car Co., Elkhart, Ind., is running night and day, Sundays included, so as to finish a government order of 4500 ambulance bodies. The manufacture of the Elcar is being continued.

The Langstadt-Meyer Manufacturing Co., Appleton, Wis., is enlarging its capacity by taking over the building occupied by the Appleton Motor Car Co. The entire building will be converted into a machine shop. The company manufactures farm lighting systems and direct connected generating units for other purposes.

The Kahlenberg Brothers Co., Two Rivers, Wis., has started the erection on a new assembling, testing and shipping building. The new building will be equipped with an electric traveling crane and the most modern testing equipment and accessories. They manufacture stationary oil engines.

The Pierce-Arrow Motor Car Co. has declared its regular quarterly dividend of \$1.25 a share, payable Nov. 1 to stockholders of record Oct. 15.

The Lauson Tractor Co. has appointed the following agencies: W. R. Holmes & Son, St. Louis, Mo.; Eastern Missouri, Southern Illinois, Kentucky, west of the Tennessee and a few counties in Northern Arkansas; Mountain State Motor Co., Charleston, W. Va.; West Virginia; Dan W. Tait, Decatur, Ill., 19 counties in Central Eastern Illinois; Comsigny Motor Truck Co., Des Moines, Ia.

The Timken-Detroit Axle Co., Detroit, Mich., is erecting a two-story addition to its factory and a one-story addition to its foundry.

Charles B. Bohn Foundry Co., Detroit, Mich., is building a two-story addition to its foundry and a one-story core room at the plant.

The Sanford Motor Truck Co., Syracuse, N. Y., has placed the following new agencies as distributors of the Sanford trucks: Donahoo Horse and Mule Co., 2701 Second Ave., Birmingham, Ala.; W. L. Fanshawe, Box 269, 322 High St., Burlington, N. J.; Joe Willoford, Ardmore, Okla.; J. H. Lincoln, Jr., Henryette, Okla.; Isaac Plasterer, Lebanon, Pa.; L. A. Farley, Lancaster, Pa.; Elano Zimmerman, Manheim, Pa.; Herr Bros., Quarryville, Pa.; Central Garage, Clinton, Conn.; C. E. Norton, Guilford, Conn.; Raoul M. Delagrange, Stonington, Conn.; Frisbie-McCormick Co., Norwich, Conn.; Martin B. Dodd, Norfolk, Conn.; J. F. Falconer, Springfield, Mass.; K. W. Osgood, 673 Connecticut Ave., Bridgeport, Conn.; Mr. Dell, Dell's Garage and Service Station, Hartford, Conn.; S. L. Benedict, 73 N. Main St., S. Norwalk, Conn.; New England Motor Sales Co., 23 Putnam Ave., Greenwich, Conn.; E. J. Denning, 55 W. Main St., Stamford, Conn.;

Jefferson Auto Co., 27 Jefferson St., Waterbury, Conn.; Central Garage, 36 Third St., Derby, Conn.; Gilmartin & Day Garage Co., 127 Colony St., Meriden, Conn.; Wm. Luby, 9 South Colony St., Wallingford, Conn.; Park Avenue Garage, Meadville, Pa.; P. Mori & Co., Loyalhanna, Pa.; Woodling Auto Co., Haysville, Pa.; T. C. O'Rourke, Washington, Pa.; J. P. Mooney, McKeesport, Pa.; J. L. Culp, Indiana, Pa.; Elite Garage, Charleroi, Pa.; W. C. Laderer & Co., Butler, Pa.; Maurice Machine Co., Jeanette, Pa.; National Auto Co., Uniontown, Pa.; Rose Brothers Auto Co., Greensburg, Pa.; F. M. Robb, Latrobe, Pa.; Snyder Bonze Baker Co., Bellevue, Pa.; A. E. Sarver, Bellevue, Pa.; D. L. Shaffer, Kittanning, Pa.; Wells Mills Electric Co., Connellsville, Pa.; J. A. Stokes, Blairsville, Pa.; Myers Carriage Co., Franklin, Pa.; Carahan Transfer and Storage Co., Oil City, Pa.; Overland-Warren Co., 617 E. Pennsylvania Ave., Warren, Pa.; Pooler & Emery, Skowhegan, Me.; O. F. Files, P. O. Square, Bangor, Me.

The Grand Rapids Brass Co., Grand Rapids, Mich., is erecting an addition to its factory. It will contain three stories and basement. The building will be completed in January.

The Grant Motor Car Corporation, Cleveland, O., declared a dividend of 1½ per cent. on its preferred stock for the quarter ended Oct. 15, which was payable Nov. 1 to stockholders of record Oct. 20.

The Northwestern Chemical Co., Marietta, O., will erect a complete new building, to replace the one that was destroyed by fire in September. The building will be 50 by 150 feet and fireproof throughout. It will cost \$35,000.

The C. R. Wilson Body Co., Detroit, is erecting a two-story factory 98 by 303 by 42 feet that will cost \$250,000.

The Northern Electric Co. has been appointed distributors for Pasco wheels in the whole of Canada and will handle them in its Canadian branches.

The B. & H. Machine Products Co., Detroit, Mich., will devote its time to government machine production work. The company will manufacture parts essential to airplane and truck engines. The officers of the company are as follows: W. J. Baird, president; Andrew Baird, vice president and treasurer; Clay G. Howery, secretary and general manager.

The Gomery-Schwartz Motor Car Co., Philadelphia, Pa., is now distributor for the Knickerbocker Forma-Tractor, which is designed to be attached to a Ford passenger car in 15 minutes. The company will give, during this month, public exhibitions in its territory, which includes Eastern Pennsylvania, Southern New Jersey, Delaware and Maryland.

The Motor Mercantile Co., Salt Lake City, Utah, was recently organized. It is an exclusive jobber of automotive parts, equipment and supplies, which are sold only at wholesale. The territory operated in comprises the Inter-Mountain states. A. D. McMullen is president and

general manager, V. A. Culver sales manager and G. G. Hansen, formerly buyer for Chanslor & Lyon, San Francisco, will do the buying.

The Sheldon Axle and Spring Co., Wilkes-Barre, Pa., is erecting a new machine shop. The floor area will be 85,152 square feet, which is about twice the floor space of the present machine shop. This addition will increase production at least 30 per cent. Only machining of axle parts will be done in the new building.

The National Acme Co., Cleveland, O., has declared a quarterly dividend of 1½ per cent., which will be payable Nov. 30 to stockholders of record Nov. 15.

The Schaefer Rubber Co., located at Detroit and Cincinnati, O., has increased its capital stock from \$50,000 to \$100,000.

The John Lauson Manufacturing Co., New Holstein, Wis., has placed contracts with the McBee Engine and Implement Co., Memphis, Tenn., for Western Tennessee and Mississippi; Charles Gray, Little Rock, Ark., for Central Arkansas, and the Holt Motor Co., Watertown, S. D., for 29 counties of that state.

The Avery Co., Peoria, Ill., is now employing women and many are doing the same work as the men. In every department women are employed. They are shoveling sand in the foundry, do most of the welding, place the tubes in the radiators and operate lathes in the machine shop. The women generally wear overalls. The plant has been equipped with every facility required or desirable for the comfort of the women workers, whose welfare has been carefully regarded.

The Dorplan Motor Truck Co., Schenectady, N. Y., has been organized to manufacture a truck. The company has a capital stock of \$100,000 and the incorporators are: G. L. Sidebothen, L. Basset and W. Harrington.

The Stromberg Carburetor Co. of America reports net earnings of \$431,533 for the nine months ended Sept. 30, 1918, as compared with \$318,819 for the 12 months ended Dec. 31, 1917.

The Wolverine Tractor Co., Detroit, Mich., at its annual meeting held recently, elected the following directors: W. J. Wickles, Arnold Boutel, W. E. Laur, C. A. Bigelow, W. E. Wood, W. G. Wagenhals, W. F. Austin. The company has been capitalized for \$300,000.

The Cleveland Galvanizing Works Co., Cleveland, O., has changed its name to the Chain Products Co., that its name will be more descriptive of the products. F. G. Hodell is president, H. H. Hodell is vice president and W. F. Schneider is secretary.

The Williams Foundry and Machine Co., Akron, O., has greatly increased its manufacturing space, facilities and its volume of business. The company specializes in equipment for tire factories and is one of the largest manufacturers of this class of machinery in the world, making machines or tools required for every purpose in tire making and repairing.

MOTOR TRUCK SALES MANAGERS ESTABLISH OFFICE.

A permanent office has been established at 1314 Wells building, Milwaukee, Wis., by the recently formed National Association of Motor Truck Sales Managers, which is in charge of Executive Secretary J. M. Carney, who directs all of the routine of the organization.

The objects of the association are numerous, but the activities are largely with the view of formulating policies which will be at least a guide for the members in their dealings with sales representatives and buyers.

One proposition that will receive careful consideration is that the association develop a uniform dealers' agency contract. There are those who question the widely diversified methods the vogue in the trade, and believe that far better results could be obtained were forms and practise standardized. This could also be applied to sales on time payment.

The unification of sales methods would also include those dealing with what is known as "trading," in which new vehicles are exchanged for used machines and cash or securities in some form. These are all subjects that affect the manufacturers to a greater or lesser degree, and naturally there will be exchange of policies and views.

There is no reason to believe that the determinations will be reached quickly, for they are too important and far-reaching to be decided without careful consideration. But the main purpose of the association, if realized, will be simplification of sales methods and assurance of uniform dealing.

REED TRACTORS WILL BE FIRST SHOWN AT KALAMAZOO.

The first Reed farm tractors, built by the Reed Foundry and Machine Co., Kalamazoo, Mich., will be shown for the first time at the annual convention of the Michigan Vehicle and Implement Dealers' Association, which will take place at Kalamazoo, Dec. 3-5. The new machines will be exhibited by E. L. Rose, sales manager of the tractor department, who has sent notices to all members of the association directing their attention to the machines. No statement has been made as yet concerning the type, capacity, design or construction of the Reed tractor.

STUDEBAKER DEVELOPS NEW LIGHT SEDAN.

The Studebaker Corporation is preparing to produce a new sedan type body that is to be used on the series 19 light four chassis. This is one of the first of the bodies developed during the progress of war and other work in readiness for stimulating sales. A considerable number of concerns have produced similar equipment, which will be shown as rapidly as possible. The new Studebaker sedan has a mechanical lifting device for converting it into an open touring car, so that conversion can be quickly and easily accomplished.

ELECTRIC VEHICLES WANTED BY FOREIGN BUYERS.

There is apparently a very good market for electric vehicles in some of the foreign nations if one is to base judgment on the interest manifested by concerns abroad. The Anderson Electric Car Co., Detroit, has within a few days received inquiries from firms that it had been negotiating with previous to this country engaging in the war upon Germany. In most instances the companies wanted to consummate purchases that had been proposed, and sought to have shipment of the machines, all pleasure cars by the way, forwarded as quickly as possible. The company last week sent the last of an order of 40 cars to Norway, and several days later it received a cable from the buying concern asking if more machines could be shipped. Evidently there is a boom in electric vehicle use in the Scandinavian peninsula.

PIERCE-ARROW EARNS \$2.74 A SHARE OF COMMON.

For the three months ending Sept. 30, 1918, the Pierce-Arrow Motor Car Co. earned \$2.74 a share on its common stock. The operating profits for the period was \$1,338,129, against \$1,809,729 for the corresponding period of 1917. After deducting various charges and war taxes the surplus was \$886,759, which was equal to \$2.74 on the 250,000 shares of common stock, after allowing for the dividend requirements for the preferred stock. During the preceding three months the earnings were \$2.85 a share on the common stock, against \$5.94 for the same period a year ago, but from which the war taxes were necessarily deducted.

CAR MANUFACTURERS NOTIFIED OF PRODUCTION BASIS.

As quickly as possible after the certainty of a return to pre-war conditions the War Industries Board notified the different interests of the automotive industry of the basis on which production could be resumed for the time being, so that there should be as little delay in the plans for manufacturing what had been greatly or wholly curtailed. The first announcement related to manufacturing until the first of the coming year, and as quickly as is practical further notices will be given so that conversion of essential production can be made with the least effect upon business.

HARE ASSUMES DUTIES AT THE PACKARD PLANT.

Emlen S. Hare, who was recently elected a vice president for the Packard Motor Car Co., has assumed his duties at the big plant at Detroit. Mr. Hare was for two years president of the branch of the Packard company at New York, and previous to that time was located with the company in Philadelphia. Prior to that connection he was connected with the Commercial Truck Co. of America, Philadelphia, manufacturer of electric trucks.

WILLYS-OVERLAND PLANS FOR ERA OF BIG BUSINESS.

The Willys-Overland Co., which was for a considerable time very largely engaged in war work, is planning resumption of passenger car production on a greatly increased scale. The statement is made that it will build a small Overland car in very large numbers. This machine was first exhibited a year ago at New York and it is stated that it will be turned out as quickly as materials can be obtained.

H. V. Hawk, purchasing agent for the company, while in Detroit, stated that the works would be converted from war production as rapidly as possible and manufacturing of machines begun in quantity. He said concerning the future: "We placed our cards right on the table, and in this war business played fair with the government. We did not store material preparatory to the present situation and must therefore get away to a standing start. I am now laying the lines for material for an increased production over our former manufacturing, as our company has reason to believe that the demand for cars is going to exceed any demand ever known before."

FORD PLANT WILL FINISH ITS EAGLE BOAT CONTRACT.

The contract made by Henry Ford to build submarine chasers, a type of small vessels to be known as Eagles, which is under way at the River Rouge, Mich., and Kearney, N. J., will be completed, according to Secretary of the Navy Daniels. The greater number will probably be built at tidewater rather than inland, because of the cost and the difficulty of delivering them to the Atlantic coast from the Michigan plant. Besides the Great Lakes are closed to navigation more than four months of each year and the craft cannot be accumulated on the ways in large numbers, although there is a launching well at River Rouge.

BIG BONUS DISTRIBUTION FOR GOODRICH EMPLOYEES.

Statement is made that the end of the year the B. F. Goodrich Rubber Co., Akron, O., will distribute bonuses to its employees that will aggregate approximately \$2,000,000. The individual bonus will be about 25 per cent. of the year's wage. One of the reasons for this liberality is said to be the very patriotic response made by the employees to the appeals for subscriptions to Liberty Bonds and purchases of War Savings Stamps.

WILLYS CONTROLS NEW PROCESS GEAR CORPORATION.

The New Process Gear Corporation, Syracuse, N. Y., one of the largest concerns engaged in gear production, has been acquired by John N. Willys, president of the Willys-Overland Co., Toledo, O., and there is reason to believe that he will continue the operation of the works with little change of policy. The company is capitalized at \$3,000,000 and it is one of the substantial industries of Syracuse.

FOREIGN TRADE SHRINKAGE DURING OCTOBER.

The value of imports into the United States during October amounted in value to \$247,000,000, as against \$221,000,000 for the same month of 1917, and \$262,000,000 for September. The exports for the month were \$503,000,000, as against \$542,000,000 for October, 1917, and \$550,000,000 for September.

During the 10 months ending with October the imports were in value \$2,569,000,000, as against \$2,504,000,000 for the same period in 1917, and for the same period the exports were \$5,063,000,000, against \$5,146,000,000.

WILLIAMS, DODGE FOREIGN SALESMAN, RETURNS.

After an absence of 15 months, during which he visited England, South Africa, Spain, Portugal and South America, E. C. Williams, foreign district representative for Dodge Bros., has returned to Detroit. He is preparing to develop business relations he established during his stay abroad.

BAIRD MACHINERY CO., OCCUPIES WHOLE BUILDING.

The W. J. Baird Machinery Co. has acquired possession of the entire building at Brush street and Jefferson avenue, Detroit, which has 75,000 square feet of floor space. The company deals in wood and metal working machinery and tools, transmission machinery and manufacturers pottery equipment. The concern is said to be one of the largest in the United States.

ADDITIONS TO STANDARD TRUCK PLANT.

An addition is now being made to the works of the Standard Motor Truck Co., Detroit, which is located south of No. 1 plant. The structure will be 65 by 175 feet and as soon as this is completed a second unit of like dimensions will be started. The rapidly increasing business of the company, according to President A. Fisher, has made the erections necessary. The buildings will be given over to general purposes.

ERSKINE MAY BE DIRECTOR OF FEDERAL BANK.

The business men, bankers and those prominent in industrial enterprises in Detroit and that section of the country of which the city is the commercial center, have indorsed President Albert R. Erskine of the Studebaker Corporation as a director for the Federal Reserve Bank at Chicago.

BORNHOLT JOINS BUICK CO.

O. C. Bornholt, who was for a considerable period factory manager for the Holley Brothers Co., Detroit, manufacturer of carburetors, has been engaged as mechanical expert by the Buick Motor Co., Flint.

Army Officers Find a Fuel Superior to Gasoline

Statement is made at Washington that a fuel oil claimed to have qualities superior to gasoline, which has been given the name of "Liberty Fuel," has been developed by Maj. O. B. Zimmerman and Capt. E. C. Weisgerber of the research and development division of the general engineering department at the national capital.

According to this statement this oil is the result of experiments extending over a period of five months, and that during these experiments what may be regarded as every practical test has been conducted with internal explosion engines built for automobile vehicles, stationary work, airplanes and other purposes.

Maj. Zimmerman is attached to the United States Reserve Engineer Corps and is a well known authority on internal explosion engines practise. He has written extensively of the general subject of engines, and is extremely well qualified to judge the merit of the fuel. Being in the service of the government he has no personal interest other than what would obtain to the automotive industry as a whole from what was developed expressly as a resource for the government in its war against Germany.

Maj. Zimmerman, while he has been quoted with reference to results from the fuel, states that the credit for production should be given Capt. Weisgerber, who is a very well known gas and oil engineer. In a general way he confirms a discovery that will be a great benefit to the people. The method of production is possessed by the War Department. Whether it will be made known to the oil producers, so that they may produce fuel in larger volume (which would seemingly mean a reduction in the price of engine fuel), cannot be stated. Statement is made that the fuel is now being produced in large quantities for the use of the government.

The fuel has a base of kerosene and it is a combination of oil, specially treated, that has superiority to any other that can be produced in large volume for commercial purposes. Maj. Zimmerman is quoted as saying: "There'll be no more gasless Sundays now that Liberty fuel has been discovered. Liberty fuel acts completely as a gasoline substitute. It is odorless, tasteless and non-corrosive. It leaves less residuum of carbon than any gasoline, requires less air or oxygen for combustion and develops greater horsepower. The force of the explosion has been found to be 30 per cent. greater than gasoline."

RIPPINGILL RETURNS TO THE HUDSON COMPANY.

After a considerable stay at Washington, where he was engaged almost continuously since the beginning of the war with Germany, E. V. Rippingill, assistant sales manager of the Hudson Motor Car Co., has returned to Detroit and resumed his duties with that concern.

SALE OF CARS IN FAR EAST.

"Motor Vehicles in Japan, China and Hawaii," is the title of a booklet just published by the Bureau of Foreign and Domestic Commerce of the Department of Commerce, which deals with the sale of motor vehicles as a business in the countries specified. The business is not large in number of machines, for many American cities have more than both China and Japan combined, but there is prospect of great growth and it is important that America maintain the lead with its production of medium and low priced cars.

Thus far Hawaii has been a better market than either Japan or China, and is a worth while locality for development. The general agitation for the construction of good roads is expected to result in a constantly increasing demand for power vehicles. The report is written by Tom O. Jones and it is extremely valuable for one doing business or considering trade connections in the Far East. Copies may be obtained from the office of the superintendent of documents, Government Printing Office, Washington, D. C., at request, enclosing 15 cents in coin or money order, or from any of the district offices of the Bureau of Foreign and Domestic Commerce, with the same enclosure, specifying S. A. Series No. 170.

FORD COMPANY RESUMES THE PRODUCTION OF CARS.

The Ford Motor Co., Detroit, has resumed the production of passenger cars and is beginning to distribute machines in small numbers to its branches and sales representatives. The first shipment made from the factory consisted of approximately 25,000 machines, which has been built for government use, but which was cancelled upon the cessation of hostilities. This was a very fortunate condition, for it gave Ford dealers machines which were believed to be unobtainable.

SEEKING AUTOMOTIVE TRADE FOR BRITISH INDIA.

Any concern interested in the production or sale of automotive equipment and machinery and who desires representation in British India, can communicate with P. C. Sawyer of Hill, Sawyer & Co., Bombay, who is now in the United States making trade connections. He can be reached in the care of J. B. Crockett Co., Inc., 44 Whitehall street, New York City. The concern operates in a large way in a considerable section of India.

RAW MATERIALS IMPORTED SHOW BIG INCREASE.

During the nine months ending Sept. 30 raw material valued at \$944,000,000 for use in manufacturing was imported into the United States, which was a very great gain in value as compared with the total for the corresponding period in 1914, when the total was \$482,000,000. The volume, however, was very little changed, the seeming great increase being accounted for by the steady advance of prices.

TRUCK TIRES

New, Fresh Standard Makes Slightly Blemished

Size	List Price	Our Price	Size	List Price	Our Price
32x3	\$39.20	\$23.50	38x3	\$52.14	\$27.60
32x3 ¹ / ₂	45.90	27.50	38x3 ¹ / ₂	61.60	36.95
32x4	52.80	31.70	38x4	62.50	37.50
34x3	41.30	24.75	38x5	79.20	47.50
34x3 ¹ / ₂	48.55	29.10	38x6	95.85	57.50
34x4	55.95	33.60	38x7	118.80	71.30
34x5	70.10	42.05	40x3 ¹ / ₂	64.35	38.60
34x6	85.45	51.30	40x4	65.65	39.40
36x2 ¹ / ₂	33.75	21.45	40x5	83.50	50.10
36x3	43.65	26.20	40x6	101.15	60.70
36x3 ¹ / ₂	51.25	30.75	40x7	121.50	72.90
36x4	59.05	35.45	42x2 ¹ / ₂	40.00	25.00
36x5	74.90	44.95	42x4	77.00	46.20
36x6	90.70	54.40	42x5	87.70	52.60
36x7	108.05	64.85	42x6	106.95	64.20
36x10 Giant	228.20	135.00	42x7	128.15	76.90

Solid Tires for 30x3¹/₂ Clincher Rims, \$20.00

Special Discounts on Quantity Orders. Dealers' and Fleet Owners' Prices on request. We will gladly call on Dealers and Fleet owners and explain our proposition. A postal will bring us.

Mail Orders sent C. O. D. subject to inspection. Send in your wheels. We return same day as received with tires applied. Express paid one way

**Tires Applied Day or Night
Best Service in New England**

We Guarantee to Reduce Your Tire Cost Per Mile

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**TRUCK TIRE JOBBERS
Largest Stock of Solid Tires in New England**

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BOSTON, MASS.**

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CANCEL ARMY TRUCK CONTRACTS

STATEMENT is made that the War Department of the government has authorized the cancellation of contracts existing and contemplated for 81,000 trucks for army service. The total number covered by contracts and proposed contracts is not stated. In some instances new orders, authorized or proposed, have been withheld. Some contracts for which work has been begun, have been modified, the number of vehicles being reduced approximately one-half.

The following statement includes but a small part of the contracts, but it is sufficient to show to what extent the industry will be affected through the cancellation and modification of contracts. The total number of vehicles included in these contracts was 15,935, and with the cancellation of orders given the Peerless and Garford company for 3000 and 4000 1½-ton trucks, and the reduction of the others 50 per cent. the total that will be produced will be 4568.

Contractor	Order	Load Rating	Modified Order
Federal Motor Truck Co.	500	3½	250
Federal Motor Truck Co.	300	5	150
Gramm-Bernstein Motor Truck Co.	100	3½	50
Hurlburt Motor Truck Co.	200	5	100
International Motor Co.	200	2	100
International Motor Co.	800	2	400
Kelly-Springfield Motor Truck Co.	920	3	460
Kelly-Springfield Motor Truck Co.	340	1½	170
Moreland Motor Truck Co.	40	2½	21
Moreland Motor Truck Co.	60	4	30
Packard Motor Car Co.	3,000	3	1500
Peerless Motor Car Co.	500	3	250
Peerless Motor Car Co.	2,000	1½	*
Republic Motor Truck Co.	250	5	125
Standard Motor Truck Co.	300	3½	150
Velle Motors Corp.	125	3	63
Pierce-Arrow Motor Car Co.	1,100	2	700
J. C. Wilson Co.	200	2	100
Garford Motor Truck Co.	4,000	1½	*
Total	15,935		4,568

*Cancelled.

The situation with reference to the automotive industry in bald facts is this: Following the policy established by the government many of the concerns building passenger cars converted their manufacturing departments as nearly as possible to the 100 per cent. war basis required by Jan. 1. The truck manufacturers planned and were preparing to do all the essential war work possible in addition to building the trucks allowed by the order of the War Industries Board.

Cessation of conflict, the armistice and the collapse of Germany means that these industries must resume normal manufacturing operations as quickly as possible. If government work ceases entirely there will be an interim of inactivity, with enforced idleness of labor, unless some of the work authorized by the government can be continued. In other words, if government work is terminated by cancellation of existing contracts labor will be idle unless other employment can be found.

Because of this fact quick action has been necessary and constant conferences have been held by the War Industries Board, the Automotive Products Section of the board, the War Department, the United States Employment Service and other bodies that have jurisdiction and can control the situation largely through the contracts existing.

The National Automobile Chamber of Commerce, representing the industry, has been extremely active because of the uncertainty of the interests until a definite policy has been announced by the government. The National Automobile Chamber of Commerce has a committee consisting of Hugh Chalmers, Alvan MacCauley of the Packard Motor Car Co.; H. B. Jewett of the Paige-Detroit Motor Car Co., Ray D. Chapin of the Hudson Motor Car Co., Col. Charles Clifton of the Pierce-Arrow Motor Car Co., representing the passenger car manufacturers, and George H. Graham of the Pierce-Arrow Motor Car Co.; Windsor T. White of the White Co., L. H. Boylston of the Service Motor Truck Co., S. M. Williams of the Garford Motor Truck Co., and A. C. Burch of the Clydesdale Cars Co., representing the truck manufacturers.

This committee has held conference and formulated a statement that has been presented to Chairman Bernard M. Baruch of the War Industries Board, which statement has not been made public. It reflected the conditions which the industry must meet as forecasted by the members of the committee, and the relief that must be assured to protect labor during the adjustment of the different enterprises incidental to resumption of normal production.

From the viewpoint of national economy cancellation of all contracts and termination of, or at least minimizing, expenditure of all kinds would appear to be desirable, but at the other hand the government has compelled the industry to cooperate with it and this has necessitated cessation of normal operations, so

that there is not only the obligation of the government to protect the industry, but the imperative need of protecting labor as well.

The industry can only be assured by the determination of extremely important (to the industry) policies, one of which is the disposal of vehicles now owned by the nation and in war service, which will be in large part unnecessary after the demobilization of the army in this country and the termination of active operations abroad. If the trucks bought for the army are placed in the markets and sold for such prices as may be offered for them, there would undoubtedly be disruption of the industry for a long period of time, because of the uncertainty of demand and the unwillingness of manufacturers to build machines that could not be sold because of the high prices that would be necessitated by war period cost of materials and the wages demanded by labor.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912. OF

AUTOMOBILE JOURNAL,

PUBLISHED MONTHLY AT PAWTUCKET R. I.

For October 1, 1918.

State of Rhode Island, County of Providence.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared William H. Black, who, having been duly sworn according to law, deposes and says that he is one of the owners of the Automobile Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

PUBLISHER, WM. H. & D. O. BLACK....Pawtucket R. I.

EDITOR, E. K. BROWN.....Providence, R. I.

BUSINESS MANAGER, WM. H. BLACK..Pawtucket, R. I.

2. That the owners are:

WM. H. BLACK.....Pawtucket, R. I.

D. O. BLACK.....Pawtucket, R. I.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages or other securities are:

M. J. BLACK, Mortgagee.....Pawtucket, R. I.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

(Signed) WILLIAM H. BLACK, Co-Partner.

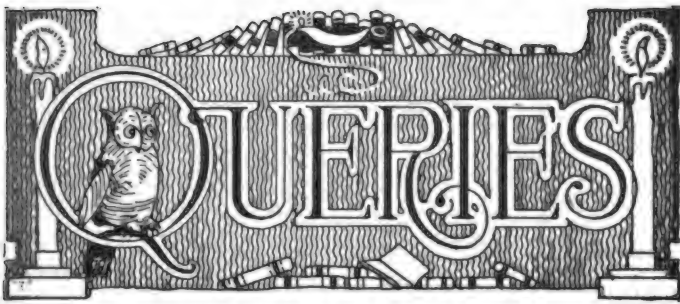
Sworn to and subscribed before me this 4th day of October, 1918.

(Signed)

THOMAS BESWICK, Notary Public.

[Seal]

(My commission expires June 30, 1920.)

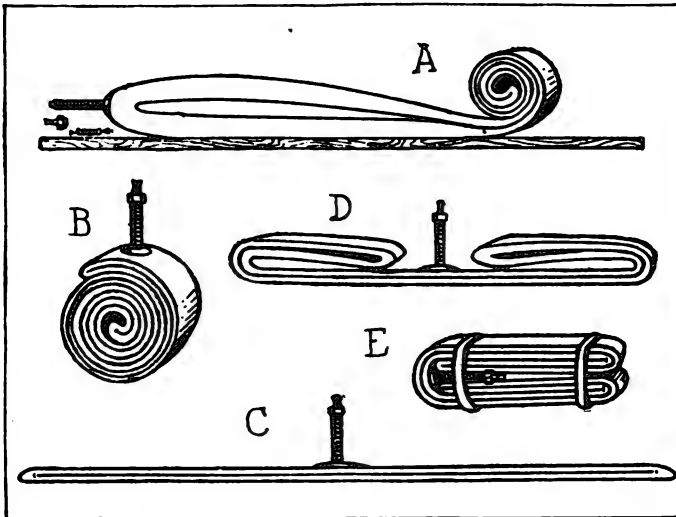


PROTECTING EXTRA TIRES.

(E. G. B., Indianapolis, Ind.)

As tire manufacturers and persons repairing same say to keep tubes protected and free from chafing when carried as extras on the car, will you kindly state in your Journal a good method of doing this? I have done as advised by a tire repair man and taken out the valve of my tubes and rolled them up, but even so am unable to get a very small bundle out of it.

You have been advised correctly. In fact it is absolutely necessary to keep extra tubes well wrapped up and protected from rubbing against other articles in the tool box, which might chafe the tube or cut into the edges of same. A very good method to follow in doing this and the way that is usually done is as follows: First, remove the valve insides from the tube and flatten the latter out so that the valve stem will be at one end. In this position commence at the other end and roll it tightly towards the valve stem as shown in A, until it is rolled as shown in B. Now, being sure that all air is out of the tube, replace the valve insides so that no air will enter. The next thing to do is to flatten the tube out again, but this time with the valve stem in the center as shown in C. Beginning at either end fold the tube over onto itself once as shown in D and then fold both sides onto themselves with the stem in the middle as shown in E, holding in place with a couple of elastic bands. To carry this in the tool



Proper Method of Folding Tubes for Storage.

box or in any place where there is a possibility that it will come into contact with other objects it should be wrapped up. Preferably this should be done first in a newspaper and then all wrapped in a strong cloth, being tied together with a string or piece of hemp. This will keep the tube dry and clean and also be a great protection from chafing. If there is a hole or puncture or other opening in the tube of course it will be impossible to roll the tube up tightly as herewith directed, as the air will enter the tube as fast as it is forced out. In fact, this will probably answer your implied question. You probably have been unable to wrap your tube up tightly because as soon as you had forced all the air out of the tube you did not replace the valve insides, which is essential.



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THE HEIGHT OF PERFECTION

You cannot secure more efficient and economical carburetion than by the Zenith. Simplest to adjust, and once adjusted stays adjusted.

Known the world over as the

ZENITH OF CARBURETOR EFFICIENCY

A long list of American builders of cars, trucks and aeroplanes believe this simple, plain tube device to be the best insurance for permanent carburetor satisfaction.

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New York Detroit, U. S. A. Chicago

NEW DEPARTURE BALL BEARINGS




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Stamina
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The New Departure Manufacturing Co., Bristol, Conn.
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The highest quality lowest priced lamp produced.

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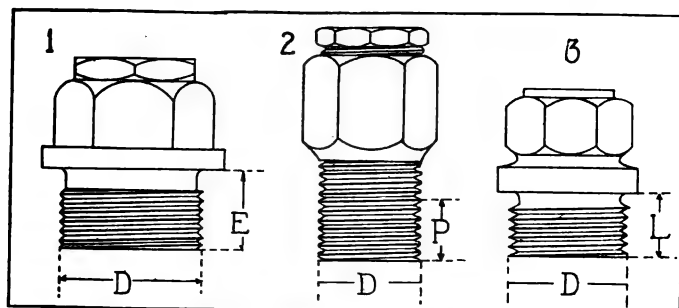
A. C. CHAMPION SPARK PLUGS.

(H. K., Cleveland, O.)

I am interested to know what "A. C." stands for on the Champion spark plug; and also how many different style threads are used on spark plugs? Could you make a sketch of them in the next issue of The Automobile Journal?

"A. C." is a trade mark that was originated by Albert Champion, who first manufactured the Champion spark plugs, it being the initials of his name. These plugs were first made in Boston and later the factory was established at Flint, Mich.

There are three types of spark plugs commonly manufactured commercially, the one being known as the ½-inch pipe size, the second the metric and the third the S. A. E. standard. From the accompanying sketches one will note the characteristics of each type. With reference to these, spark plug diam-



Three Types of Spark Plugs: 1, S. A. E. Standard Size; 2, ½-inch Pipe Size; 3, Metric Size.

eter is assumed to be the size of the shell. The following specifications are sufficiently clear:

One-half-inch spark plug sizes—D, diameter at end, .815 inch; P, length of thread, ¾ inch; taper, ¼ inch per foot; threads, 14 per inch, V form, slightly rounded at top and bottom, depth .057 inch.

Metric size—D, diameter, 18 millimeters (.708) inch; L, length of thread, about ¾ inch straight, no taper; threads, 1.5 pitch (about 17 per inch), V form.

S. A. E. standard—D, diameter, ¾ inch; E, not less than ½ inch; F, not more than ¾ inch; length of thread not less than ¾ inch, straight, no taper; threads, U. S. standard, 18 pitch.

OILING SYSTEM OF OLDSMOBILE DEFENDER.

(J. T. C., Attleboro, Mass.)

Would you explain the oiling system of the Oldsmobile Defender, model 1912? The system I wish explained has a pressure gauge on the dash, no splash and all bearings have small pipes leading to them. What produces the pressure that forces the oil through the leads? I do not see any pump.

This system has a plunger pump that is driven by a cam on the camshaft, that is operated much the same as a valve tappet. The pump plunger is lifted by a spring and is forced down by the cam as it revolves. The pump is located on the left side of the engine case at the forward end, and if you will look into the oil filler you will note a screw slightly below the top. This screw adjusts the pumpage, as seating it increases the volume of oil forced by the pump each revolution and unseating it (backing out the screw) reduces the volume. Wide variance can be made in the volume of oil pumped by turning the adjusting screw. The pump itself is attached to the lower section of the engine crank case, and is removed when the lower section is taken off.

From the pump, of course, the oil is forced through the different leads and through the system to the different main points of lubrication. Considerable oil is thrown off and distributed about the interior of the engine by the centrifugal force of the revolving crankshaft.

FIRING ORDER OF COLE EIGHT.

(J. E. M., Atlanta, Ga.)

Will you publish the firing order of the 1915 Cole eight-cylinder motor, and show a diagram of how this is laid out, in an early issue of your magazine, which I have read constantly for the past six years. I have derived much benefit

(When Writing to Advertisers, Please Mention The Automobile Journal.)

Does it Lubricate the first Five Minutes

THAT'S the question that floors common grease. Grease has to be partly melted with frictional heat before it acts at all.



begins to lubricate the instant the car starts and prevents bearings from heating. NON-FLUID OIL provides positive protection to all parts from frictional wear and reduces power consumption.



Use "KOO" Special grade for gears. "KOO" for bearings and differentials that are not oil tight. Packed in orange colored cans; sold by best dealers everywhere.

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COES The Standard WRENCH



WRENCHES that are made for the hardest service. They do not break but grip and hold and their efficiency never lessens.

Economy tools as they last longer, give better service and never become useless through wear.

Utility wrenches of the highest order for car owners and repairers as they can be used in compact places and once set hold like a vise.

**The Best Wrench
The Cheapest**

All dealers carry in stock the exact size to meet your need. They recommend Coes Wrenches as all good dealers have for more than fifty years.

COES WRENCH COMPANY
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RAIN-SNOW CLEAR VIEW WINDSHIELD CLOTH

PREVENTS ACCIDENTS

Just RUB IT OVER THE GLASS and RAIN or SNOW cannot collect to obstruct the vision.

INSIST UPON THE "RED CLOTH"

Which is guaranteed to give continuous use for one year or money refunded. Made only by

**SUFFOLK MANUFACTURING CO., INC., DEPT. D.
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PAIGE

The Most Beautiful Car in America

A Complete Line of Open and Enclosed Models

Paige Dealers are the biggest money makers in the motor car field. Write for complete information.

The Paige-Detroit Motor Car Company, Detroit

New Era "Better" Strapless Side Tire Holder.



Made of steel, has no cast parts to break and no straps to wear out or be lost. The locking device is a part of the tire holder. Tire easily slips into place and is quickly adjusted. A convenient, light tire carrier that has many exclusive advantages. Self-expanding carrying rim can be furnished extra where demountable rims are not used.

Ask your dealer for the New Era "Better" Strapless side tire holders. Prices \$2 to \$3.

New Era Spring & Specialty Co.
1177 Hamilton Ave. Grand Rapids, Mich



Shurnuff
TRADE MARK
Combination Manifold For Ford Cars

Other Shurnuff Accessories for Fords:
Shurnuff Grease Retainers prevent grease leaking from rear axle. Per pair \$0.90; in Canada \$1.35.
Shurnuff Windshield Ventilator. Price \$7.50; West of Rockies \$7.75; in Canada \$11.25.
Shurnuff Running Board Fender Supports prevent sagging and vibration of front fender. Per pair \$4.50; West of Rockies \$4.75; in Canada \$6.75.

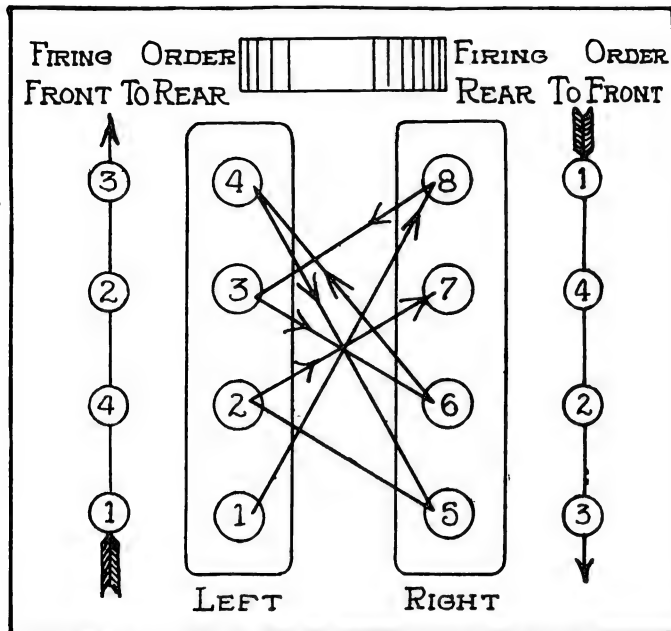
saves gasoline and makes cold weather starting easier. It combines intake and exhaust so that exhaust heat dries incoming gasoline and vaporizes it perfectly. Result: Smoother running, more power, more miles per gallon, less carbon. Price \$9.00; West of Rockies \$10.00; in Canada \$12.50.

SHURNUFF MFG. CO. Dept. E **ST. LOUIS, MO.**
Sales Dept. **THE ZINKE CO., Chicago, Ill.**
(When Writing to Advertisers, Please Mention The Automobile Journal.)

from the correspondence and practical suggestions department.

In the Cole Eight 1915 engine the two blocks of four cylinders each are set side by side and slanted at an angle to form a V, with the valves inside. The cylinders on one side are reversed with reference to the cylinders on the other side. Standing at one end of the engine the firing order of one block is 1-4-2-3. Passing around to the opposite end of the engine, the firing order of the other block will be the same as the first named block, that is, 1-4-2-3. For the convenience of the operator of the car the maker of the Cole Eight numbers the cylinders of the bank at the left of one standing in front of the radiator or engine from 1 to 4 (1-2-3-4) and those in the other bank 5-6-7-8, counting from the front.

Any eight-cylinder motor must fire alternately on the banks, and beginning with the first cylinder of the left bank and the last cylinder of the right bank, the firing order is, in the order of cylinders, as shown above. But as the cylinders have been numbered consecutively for the convenience of the



Firing Order of an Eight-Cylinder Cole Engine.

car operator, when the firing is referred to by the manufacturer, as will be noted in the accompanying sketch, the firing is, 1-8, 3-6, 4-5 and 3-7. Or, to put it in another way, no matter at which end of the engine the operator may be standing the first cylinder to fire is the first of the left bank, and the second is the last of the right bank. The order from these two cylinders thereafter is 3-4-2 alternately on the banks.

COOLING SOLUTIONS FOR WINTER.

(S. A. M., Dane, Wis.)

Please give me a chemical mixture for an automobile radiator that will not freeze at zero and is not harmful to the motor.

A solution for an automobile cooling system that will not freeze at zero may be made as follows:

Water, 70%; wood alcohol, 30%; freezing point, nine below zero.

Water, 65%; wood alcohol, 35%; freezing point, 16 below zero.

Water, 70%; wood alcohol and glycerine in equal parts, 30%; freezing point, five below zero.

Water, 60%; wood alcohol and glycerine in equal parts, 40%; freezing point, 23 below zero.

Water-calcium chloride, three pounds to gallon, freezing point, two above zero.

Water-calcium chloride, four pounds to gallon, freezing point, 17 below zero.

Water-calcium chloride, five pounds to gallon, freezing point, 39 below zero.

Chemically pure calcium chloride will have practically no

destructive influence on metal; chemically pure calcium chloride is much more costly than the commercially pure, the latter containing a varying volume of acid. This acid can be neutralized by adding ammonia or slacked lime to the solution until blue litmus paper wetted in it will not change in color to red. This test is unfailing and can be made any time.

When alcohol is used this will be more or less dissipated with use of the car or vehicle and the proportion lost should be restored. The test of the liquid is specific gravity, a reading of .960 by hydrometer indicating 33 per cent. wood alcohol and .950 41½ per cent.; a reading of .960 by hydrometer indicating 30 per cent. denatured alcohol and .950 38 per cent.

DIFFERENTIAL GEARS ARE NOISY.

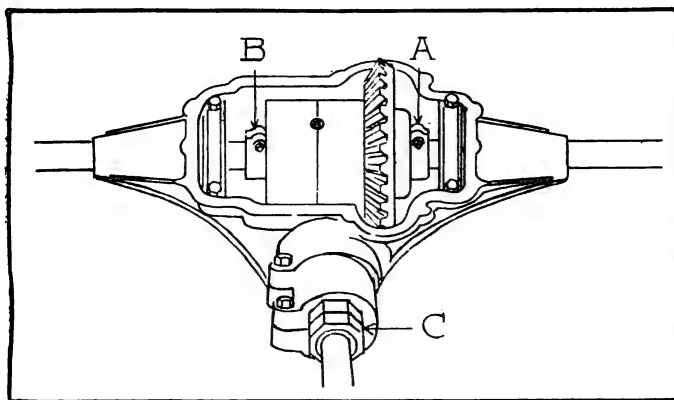
(P. W. W., Staunton, Va.)

What is wrong with the differential of my car? It is noisy in operation and the housing becomes too warm for me to put my hand on it. I have not attempted to do anything to it, and would like your advice before proceeding to fix it.

There are several causes for noisy differentials, but there can be only two good reasons why the housing should become unbearably hot. In the last mentioned case it is apparent that either the bearings fit too tightly or there is urgent need of lubricant. Although all differentials are not constructed alike, the principle of operation is generally the same, and, therefore, you can find assistance in the sketch published on this page. Assuming that the heat is due to the gears being meshed too deeply, which is more than likely the case, then you should make adjustments as suggested in the following:

When the master gear is too deeply in mesh with the driving pinion, the bolts on each adjusting collar should be loosened and the adjusting collar, indicated by A in the sketch, should be turned to the right, thus forcing the whole housing, with the master differential gear attached, further away from the driving pinion. After the proper adjustment has been made the collar indicated by B in the sketch should be securely tightened and collar A turned to the left until it is tight against the gear, after which it should be turned back to the right until there is a play of about .005 of an inch. This back lash is absolutely necessary; without it friction would develop between the collars and the roller bearings and produce heat.

Sometimes it will be found that the driving pinion gear is



Cut Away View of a Typical Differential Type, Showing Means of Adjustment.

not meshing with the master differential throughout its entire surface, and this must be compensated for by the pinion gear adjusting collar. Generally this collar is controlled by two nuts, located at the point of the housing marked C in sketch, where the drive shaft enters. One of these nuts acts as a lock, while the second is the real adjusting member.

If after these adjustments have been made the assembly is still noisy, it is probably due to the gears being badly worn, in which case the only practical remedy is to have them renewed.

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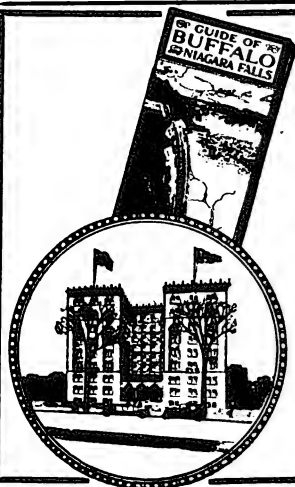
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REMOVING CARBON WITH OXYGEN.

(H. M. Y., Harrisburg, Pa.)

Will you kindly advise how oxygen is used for cleaning carbon from cylinders?

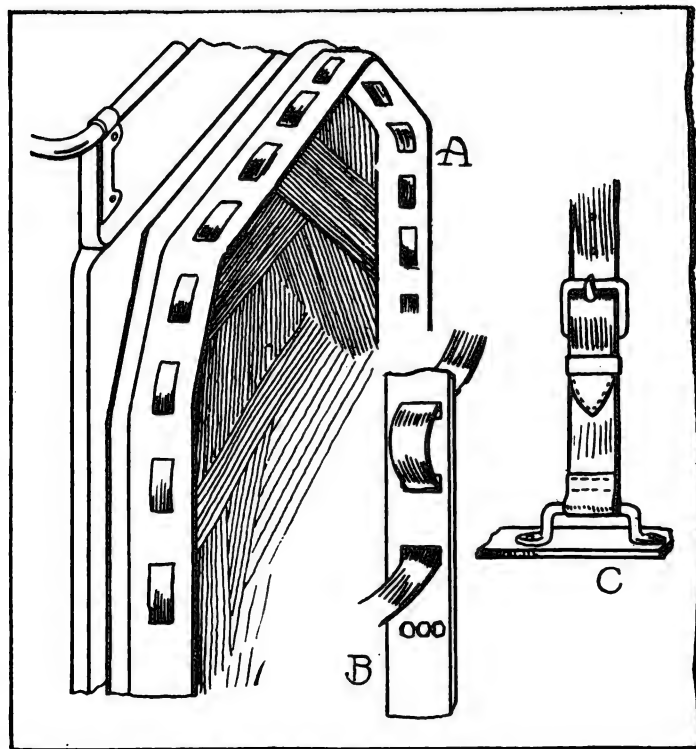
It requires special equipment to remove carbon from the engine by the oxygen method. The oxygen is stored in a large cylinder to which is attached a hose connection and a metal nozzle. The spark plugs are removed from the engine cylinders and the nozzle inserted through the opening. The oxygen coming in contact with the carbon forms a mixture which is ignited by inserting a lighted taper or match into the cylinder. The carbon and oxygen combine and burn, forming a gas which passes off and leaves the cylinder clean.

HOODS THAT RATTLE.

(A. E. S., Trenton, N. J.)

How can I stop the rattling of the hood on my automobile? The car is an old one and the hood is a long affair. The side clasps appear to be snug fit, but the hood rattles when I go over rough places. Would a bonnet strap stop the racket?

Though a hood strap, as suggested, should eliminate the rattle referred to, a better method would be to equip the dash and radiator supports of the hood with some anti-noise material, such as leather or raw hide. Possibly you might adapt the method some makers of the past utilized on their cars. They slotted the hood supports and wove in belt lacing, as shown at A in the sketch. At B is shown how the metal may be prepared for the leathers. Drill one or more holes, then



Illustrating Method of Preventing Rattling of Hood.

break out the edges with a small chisel, afterwards smoothing the rough places with a file. The lacing should be knotted at one end and inserted as illustrated.

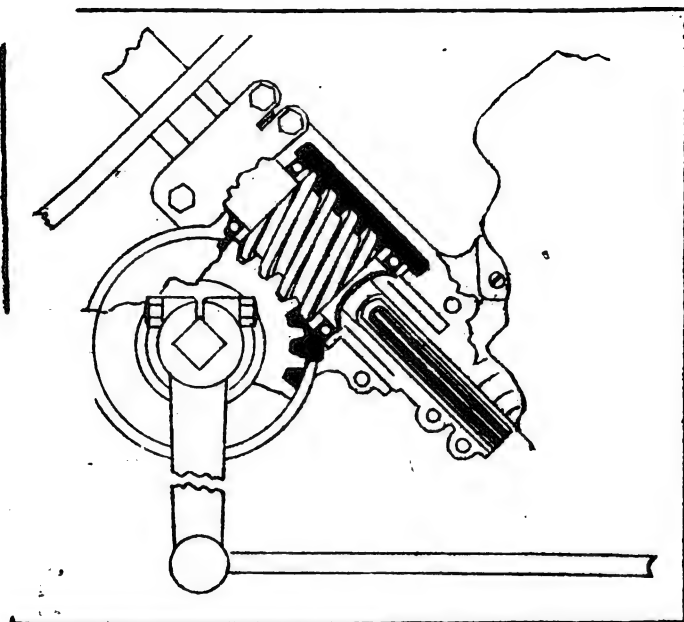
A hood strap could be applied easily and would not be very expensive. A handle, such as illustrated at C, which also shows the fitting of the strap, is attached to each board supporting the hood and to these is sewed the strap, which is made in two sections. One is equipped with a buckle and the other perforated.

IRREVERSIBLE STEERING GEAR TYPE.

(I. B. H., Syracuse, N. Y.)

I have just received my first automobile and, of course, am "green" about its mechanism. When the salesman of _____ company was selling the car to me he spoke of the importance of the irreversible steering gear with which the machine is equipped. I have forgotten much of what he said, but remember that he was very earnest about it. Will you explain what the irreversible gear is and why it is the best?

With the introduction of the irreversible steering gear type there came into automobile practise a greatly increased measure of safety in driving. The chief feature of this type is that when the front wheels strike obstructions that ordin-



Illustrating the Irreversible Type of Steering Gear Used on a Popular Priced Car.

arily would tend to deflect their straight ahead course and wrench the arms of the driver, the gear holds the wheels steady; that is why the term irreversible was aptly applied to it. The principle of construction of the irreversible type does not vary greatly from the other type, the difference being in the employment of a worm gear on the steering shaft engages with a toothed wheel to which the steering arm is attached. This is explained in the accompanying sketch. With this type of gear installed there can be no backlash from front wheels and consequently it relieves the driver of the necessity of keeping a firm grip on the steering wheel at all times, which is a considerable saving in nervous energy.

CHANGING GEARS SLOWLY.

(J. D. B., East Orange, N. J.)

I own a four-cylinder 17 series Studebaker car and cannot change from low to second without grinding gears. Can you tell me how to change silently?

The general experience with this type of Studebaker car is that the best results can be obtained by reversing the practice found satisfactory with a very large number of other machines. That is, instead of the change being made quickly, which with the Studebaker construction will cause the gears clashing, the change should be made slowly, so that the gears will be approximately equal in speed before they are meshed. This will be found true with all changes of gear ratio from low to high. You can quickly learn just what can be done and the change will be perfectly silent if you take time for the operation.

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